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OF THE

YORKSHIRE NATURALISTS' UNION.

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APPENDIX.

The List of Members for 1912 and the Excursion Programmes 215 to 235 were edited by the late Secretary, Mr. T. Sheppard.

SALIENT FEATURES IN THE HISTORY

OF THE

YORKSHIRE NATURALISTS' UNION

BEING THE

PRESIDENTIAL ADDRESS

Delivered at Sheffield, 29th January, 1904,

By W. DENISON ROEBUCK, F.L.S.

Mr. Chairman, Ladies, and Gentlemen,

My first duty in addressing you is to thank my friends and fellow-members for the very high honour they have done me in asking me to occupy the chair of the Union with which I have been officially connected as Secretary for more than a quarter of a century; and although I was most reluctant to accept, I nevertheless very gratefully appreciate the compliment you have paid me.

The subject on which I am to discourse is one which has been laid down for me by the concurrent voice of many friends.

The history of our Union, its rise and progress, involving the consideration of many ramifications, would require for its adequate treatment a knowledge of the progress of all branches of the natural sciences in our county, and would be sufficient to fill a small volume, and far beyond the limits of a spoken address.

Consequently it will be desirable to limit our attention to the main or salient features, the statement rather than discussion of the leading principles involved, and a brief and inadequate reference to the results we have achieved.

The early history of the natural sciences in Yorkshire scarcely concerns our immediate subject, but I may, perhaps, be allowed to refer briefly to the fact that of the immortal trio of English naturalists, who in the reign of Charles II. laid the foundations of the modern study of the natural sciences and ante-dated Linnæus by about a century, one was a Yorkshireman, Dr. Martin Lister, and that Yorkshire was the principal field of his scientific labours. His "Historia Animalium

Angliæ" contained the first systematic accounts of the spiders, the beetles, the molluscs, and the fossils of England, and he was also the first man to suggest the construction of geological maps.

The first origin of societies for natural history studies is—so far as our county is concerned—veiled in obscurity, and it is scarcely possible to trace it without much literary search, especially amongst the files of local newspapers.

The first societies founded in the North of England were of general scope, covering practically the whole field of human knowledge, and they were usually styled Literary and Philosophical Societies.

Of these the pre-eminence belongs to Manchester, whose Society of this name was founded in 1781, and is still a body whose published transactions rank high in value as a medium for the publication of original papers.

Newcastle-on-Tyne followed in 1792, but in our own county the movement was much later in development.

Philosophical Societies were established in 1820 at Leeds, in 1822 at York and Hull, in 1823 at Whitby, and in 1827 at Scarborough, those at Sheffield, Halifax, Bradford, Huddersfield, and Middlesbrough being still later in date.

The work of these Philosophical Societies was in actual practice the foundation of Museums, most of which are still in existence, and these Societies have in this way contributed their share to the advancement of the natural sciences in this county.

And much more than its share was contributed by one of them. For only nine years after its own foundation the Yorkshire Philosophical Society took the leading part in the establishment of the British Association for the Advancement of Science, the first meeting of which was held in 1831 in our own City and County of York.

The next movement of this kind that affected our county resulted in the establishment of societies of specialised instead of general scope, and the North of England labours of such intellectual giants as William Smith, John Phillips, Adam Sedgwick, William Buckland, to name only such as were connected with Yorkshire, and the incorporation in 1826 of the Geological Society of London, gave so strong an impetus to the study of geology as to lead to the almost simultaneous formation of the West Riding Geological and Polytechnic Society in 1837, and of the Manchester Geological Society in 1838. It is somewhat surprising that specialised societies should have been founded so early, but it may be borne in mind that they were originally established not as scientific so much as technical societies.

Both were founded by coalowners, and as the word "Polytechnic" in the title of our Yorkshire one shows, they were intended for the study of the principles and methods of mining.

The Manchester Society is still very largely a mining-engineering and coalowners' society, but it is satisfactory to know that the Yorkshire one has developed along more purely scientific lines, and is a society whose contributions to geological science are of value and importance.

We now come to our more immediate subject.

The further development was now in the direction of closer contact with Nature, and the establishment of natural history societies and field clubs for the observation of local phenomena.

Of these, the Berwickshire Naturalists' Club was the pioneer, followed in 1846 by the Tyneside Naturalists' Club, and ultimately throughout the country.

In Yorkshire the beginning was much more obscure, and there is little doubt that many societies have existed, of which nothing has been heard beyond their own immediate district.

The great stronghold of naturalists in those early days was the south-western corner of the West Riding with Huddersfield as its centre and radiant point, and in 1847 was founded the Huddersfield Naturalists' Society, which still flourishes and gives that town an honourable position in our annals. Huddersfield has never lacked a succession of able, zealous, and enthusiastic naturalists to keep alive the love for natural history research in the district.

The artisan naturalists of this district, as well as of the neighbouring towns of Halifax, Wakefield, Barnsley, Heckmondwike, etc., including many men whose labours and sacrifices in the study of natural history rendered them as worthy of sympathetic biography as any of those whom Dr. Smiles has immortalised for us.

In the more remote times we had James Bolton, of Halifax, whose works on fungi and ferns of that parish are still of value, and Samuel Gibson, of Hebden Bridge, whose services as a collector were appreciated by men of greater education and scientific eminence. Then in the time of the rise of what is now our Union, we had such men as James Varley, John Armitage, Richard Jessop, J. Bartlam, Joseph Tindall, E. Taylor, Thomas Lister, Caius Cassius Hanson, Roger Earnshaw, Joseph Wilcock, George Roberts, to name at random only a few of the departed ones, to make the success of the local societies, of which there is little doubt many existed in the villages and hamlets of South-West Yorkshire.

The principle of federation was not long in following the establishment of local societies, and it was in the year 1861 that the Association of Societies, which we now know as the Yorkshire Naturalists' Union, had its birth. Heckmondwike was the place, and William Talbot, of Wakefield, was the founder.

Mr. William Talbot, with whom the idea of a federation of societies originated, was one of the ablest and soundest field-naturalists of the district, and one whose kindly and genial

disposition endears his memory to myself and all who knew him. His admirable list of the Birds of Wakefield is almost the only published record of his work, but he was an excellent lepidopterist, and a warm-hearted and enthusiastic observer of Nature in all her aspects. He died in 1882.

In September, 1861, a meeting was held at Heckmondwike for the purpose of founding a Naturalists' Society for that town, when the Heckmondwike naturalists were supported by about sixty others from the Huddersfield, Halifax, and Wakefield Societies. At this meeting Mr. Talbot introduced the question of the advisability of more combined and organised intercourse, and pointed out the mutual benefits which would accrue. He was warmly supported by others, and then on his motion it was unanimously resolved to form a Union of Societies for the purpose of holding joint meetings periodically at the various places where societies had already been established.

Thus the Heckmondwike Naturalists' Society, and the Union which is now our own, were founded on the same day and at the same meeting, and it is to the credit of the Heckmondwike Naturalists' Society that it is the only one which has uninterruptedly kept up its connection with the Union from that day to this, a period of forty-two years. Moreover, the headquarters of the Union were at Heckmondwike during the years 1861 and 1862, and from 1870 to 1877.

It furnished during each of these periods the Secretary to the Union, and in 1870 a Heckmondwike member became its first President.

May we hope that the Heckmondwike Society may long flourish as the premier Society in our Union.

A further meeting was held on the 18th January, 1862, at which the objects were defined, rules drawn up, and arrangements made for the holding of meetings. The name was also decided upon, and the new-born federation was called the "West Riding Consolidated Naturalists' Society," a title which it retained until changed to that which it now bears.

A constitution was printed a year or two later, in which its object was stated to be "the effectual advancement of local natural science," for, by the various Societies "meeting together, having a kindly interchange of thought, and becoming acquainted with the natural history of the districts of each other, a more rapid dissemination of knowledge is attained, and facilities afforded for the better acquisition, exhibition, and exchange of specimens."

As to the organisation of the Union of this time, it was extremely simple. There was only one office-bearer, the Secretary. No President was found necessary, as the President of the Society in the place of meeting was appointed to preside. The contribution was to be, as it still is, for Societies in the Union, one penny per member. The meetings were to be

quarterly, and there was a printed card of the arrangements for the year.

During the first year, and again in a succeeding year, the meetings were held on Sundays, but this was found to be highly detrimental to the Society's success, and the practice was discontinued.

During the first four years the meetings were in-door meetings, but with the year 1866 and afterwards, out-door field excursions were substituted.

This was found to revive the old enthusiasm of the early years, and henceforward the meetings were well attended and exceedingly useful in bringing naturalists together to their mutual benefit.

It will be of interest to recall the general method of procedure at these meetings, which were held during the years 1862 to 1876. I had myself attended some of these meetings, the first at Horbury Bridge, in 1870, and others at intervals up to 1875. In April, 1876, I was appointed Joint-Secretary to the Society along with Mr. J. M. Barber.

It must be remembered that in the early years the Societies were not merely West Riding Societies, but all in or near the south west corner of the Riding, as Huddersfield, Holmfirth, Halifax, Heckmondwike, Wakefield, Ovenden, Clayton West, Norland, Ripponden, Stainland, Elland, etc., and Leeds was the furthest place represented.

As a matter of fact, all the Societies were within *walking* distance of each other, and the amount of walking was limited by all the excursions being arranged within the area covered by the Societies.

Well, the meeting having been fixed for a convenient place, usually on a Saturday, the members walked from their respective homes to the place appointed, collecting and observing as they went. On arriving the whole of the plants and other objects collected were turned out on to the tables. The Chairman then called on some good botanist to play the part of Adam, and "name the plants." The "namer" then picked up the various specimens and gave their names more or less rapidly for the benefit of the others, and in the case of plants of special interest he gave such information as he thought advisable. Other members were in like manner asked to name the insects, the " shells," the fossils, etc., and the ornithologists to report on what they had observed.

The disadvantages of these methods were various. The waste of time involved in going through all the specimens collected, whether common or not, and the want of scientific accuracy inherent in the system of mixing specimens collected on several distinct lines of route converging on one common centre, were obvious.

These considerations, and the accession to the Union of Societies so far away from the old centre as Bradford, York, and

Selby, as well as the rise of a new and more scientific race of naturalists, brought about a reconsideration of the whole position of affairs. The more active thinkers of the Society formulated a scheme of reform, which was carried into effect at the end of 1876.

This re-organisation of 1876 took cognisance of several important points. The area of operation of the federation was to be extended to the whole county, and the name was accordingly changed and shortened to that with which we are all so familiar, and it became the "Yorkshire Naturalists' Union" at Pontefract, on the 2nd of April, 1877.

The sectional system was introduced with the view of ensuring a more complete and scientific examination of the material collected, and the saving of time at the general meeting by the sections reporting only on the broad results and the more important discoveries of the day.

The excursions were to be made more definite and precise in their scope, the area investigated being restricted and properly defined, and a programme or circular printed for each. At the beginning there was the danger of the pic-nic and sight-seeing element being introduced, but—and it was the result of a very obvious object lesson—the members at the opening excursion of 1877 proved themselves wiser than their leaders, and promptly and emphatically laid it down that there were to be no sight-seeing arrangements made, no field-lecturing, and, in short, nothing to interfere with active personal investigation.

On these lines the excursions have ever since been conducted, and have, on the whole, been remarkably successful.

Our Union has been able to show that it is perfectly practicable for real scientific investigation to be carried out on field excursions.

The failures in this direction complained of by Societies in other parts of England are the usual result of neglect of the precautions I have stated.

The establishment of sections and sectional meetings to precede the general one has resulted in the saving of time at the latter, and of greater scientific accuracy in recording.

The character of the Annual Meeting also received special attention. It was felt that it should include more than mere business, and should be, as far as possible, an occasion for a social gathering of the members.

For this reason a different town is selected each year, always by invitation, the inviting Society organising a reception or conversazione.

The status of the Presidency of the Union arose in this connection, and it was from the outset deemed desirable that a combination of scientific eminence with Yorkshire connection should be aimed at, that our President should be an acknowledged leader in his subject, capable of delivering an address to

the members at the Annual Meeting, and we are patriotic enough Yorkshiremen to make it also a point that our President should be a Yorkshireman by birth, residence, association, or some connection.

In this capacity we have had a series of Presidents who have rendered service to Yorkshire science in various ways.

Mr. T. B. Oldfield, of Heckmondwike, was the first president appointed by the West Riding Consolidated Society, and he was succeeded by Mr. Joseph Wainwright, an Alderman of Wakefield. At the time of our re-organisation, the chair was occupied by our beloved friend, the Rev. W. Fowler.

He was succeeded by Dr. Clifton Sorby, of the city in which we are now met. Then in succession we had the veteran palæobotanist, Professor W. C. Williamson; the author of the standard flora of North Yorkshire in Mr. John Gilbert Baker; an entomologist of the first rank in Lord Walsingham; a distinguished microscopist in the Rev. W. H. Dallinger; an ornithologist in Sir Ralph Payne-Gallwey; the investigator of the Yorkshire Jurassic rocks in Mr. W. H. Hudleston; the author of the standard work on the birds of Europe in Mr. H. E. Dresser; the botanical Bishop of Wakefield (Dr. Walsham How); the author of the great work on the Yorkshire Coalfield in Professor A. H. Green; our own old and staunch friend and companion, and author of a standard book on British mosses, in Mr. C. P. Hobkirk; the author of many standard bird-monographs in Mr. Henry Seebohm; the investigator of the Knoll-reefs of Craven in Mr. R. H. Tiddeman; the distinguished author of the standard work on British Mosses, which it is a pleasure to know is being completed, in Dr. Robert Braithwaite; the author of the birds of the Humber District in Mr. John Cordeaux; an eminent palæontologist in Professor W. Boyd Dawkins; a distinguished physiologist in Sir Michael Foster; our leading authority on desmids and other algæ in Mr. William West; the author of the recently completed list of Yorkshire Lepidoptera in Mr. G. T. Porritt; and the leader of the new and brilliant school of glacial geologists in my immediate predecessor, Mr. Percy F. Kendall. I have not the slightest diffidence in referring to these, my distinguished predecessors, knowing well that my own election was intended as a special mark of appreciation of long service as secretary, and will not, at least I hope not, serve as a precedent for lowering the status of an office intended for the leading Yorkshiremen in our various branches of research.

The final point in regard to the re-organisation was with reference to the publication of results, for which end our Transactions were established, of which we have published to the present twenty-nine parts dealing with most of the subjects of our investigation.

This, and the publication of our monthly journal, "The Naturalist," are the end and aim of our whole existence.

Excursions and Annual Meetings, large as they may loom in our minds, and much as they may interest us, are but means of bringing us together, of promoting an interchange of thought and opinion, all with the ultimate end of our publishing the results to which our investigations may lead us.

The next step, taken after 1876, was the adoption of the prospectus of 1883, which did not affect the main lines of the Union's work, but merely laid down the various methods of procedure.

It is interesting to mention that our system of government is modelled upon the rules and procedure of the British Association.

These rules were so well drafted by the original founders that they have stood the test of many years; and our own, based upon them, have worked equally well and with the minimum of friction, the great advantage being that the government of a scientific society is thereby put in the hands of its most scientific members. The modifications subsequently made in this prospectus have been but slight, the one which is perhaps most worthy of mention being that concerning our Excursion districts. The original prospectus of 1883 had a vague and arbitrary division of the county into five Excursion districts, which did not work well in practice; and a modification made in March, 1888, substituted the five vice-counties of Mr. H. Cottrell Watson's well-known scheme for recording the distribution of plants, which is also used by conchologists for that of the mollusca. The various modifications as regards the constitution of the Executive Council being merely questions of machinery need not be referred to in any detail.

A feature of the highest importance in our history was the further development of British Association methods by the institution in the winter of 1886-87 of the first of our well-known Committees of Research, which from first to last have done so much to further our work.

In this connection I cannot withhold our tribute of respect to the memory of our friend, Mr. S. A. Adamson, who did more than any one for the development of our geological work. His genial and enthusiastic temperament, his literary abilities and business capacity enabled him to accomplish much, and it was at his initiative that our Boulder Committee and Geological Photographs Committee were founded.

Both these Committees have done a large amount of work, and the contributions made by them to the British Association work have far exceeded those made by any other similar body.

Of our other Committees, the Fossil Flora Committee, thanks chiefly to the labours of Mr. Robert Kidston and his Yorkshire coadjutors, has published a series of papers in our transactions.

The Coast Erosion Committee has been the means of

recording various notes and measurements in respect of the wearing away of our receding Yorkshire coast-line.

The Committee appointed to investigate the marine zoology and botany of the Yorkshire coast has not attained to any great success, and indeed, in this connection, it seems strange that Yorkshire should have no systematic investigators of its shore and marine life, no one to take up the systematic work done in the olden time by such men as William Bean and John Leckenby, whose specimens are in all our museums.

In like case is our Committee for investigating the microscopic fauna and flora of our fresh waters. Something has been done, but nothing of what we might expect had we men to take up the study systematically.

We had a Committee on the Disappearance of Plants, which, having completed its work and given its report, was disbanded and another, to deal with the protection of Wild Birds and their Eggs, holds merely a watching brief.

Our Bryological Committee and our Coleoptera Committee have done good, steady work, reporting annually, and include respectively all the best of the Yorkshire students of mosses and of beetles, and, I may say, that were all departments of research as efficiently supported as these two are by the students of their subjects, the Union's work would reach a higher level.

Of late years, a new line of investigation has been entered upon in botany, of which Dr. Wm. G. Smith is the leader, in which plants are studied in the mass, and mapped according to their associations with each other, and good results have been attained. Two sheets of the map have already been published for Yorkshire, calculated to be of great value for botanical study, and the only improvement that can be here suggested, is that the maps should, either on their face or their margin, show the exact date when the survey was made, to afford a suitable base of comparison with future work. We have appointed a Committee to co-operate with Dr. Smith in this desirable investigation.

To conclude the notice of our Committees, we may note exceedingly good work done at the Fungus Forays, which form so interesting and important a feature in our year's programme.

The first Fungus Foray we had in Yorkshire was in 1881, at Studley and Harrogate. It was followed in 1888 by one at Bramham and Harewood, and in 1891 was held the first of a series which have taken place annually. We have had the benefit of the presence of many distinguished mycologists at the gatherings, but more particularly are we indebted to Mr. George Massee and Mr. Charles Crossland for the success which has attended them.

The history of our publications practically involves the whole history of natural history research in Yorkshire for the period of the Union's existence, as most of the work done and

the books and papers published has arisen either directly or indirectly from the impetus which our activity has given to these studies.

"The Naturalist," a monthly journal of natural history, which is our organ, is one of the oldest scientific journals. It dates back to 1833, and although there are several series, and intervals of time between some of them, there has always been a connecting link, a transfer of title and of copyright, sufficient to enable us to regard the journal as a continuous whole.

The first series was one of twelve numbers, published in 1833, under the title of "The Field Naturalist," and the editorship of Prof. James Rennie. The second series began in October, 1836, and was simply "The Naturalist." Its first editors, were B. Maund and W. Holl. With the second volume it became distinctly a Yorkshire publication, under the editorship of Neville Wood, of Campsall, near Doncaster, when the series ran to its fifth volume, and ended with the year 1839.

The journal remained now in abeyance for about eleven years, when the title and copyright were transferred to a new series, edited by Beverley R. Morris, and afterwards by the Rev. F. O. Morris, both of whom had been actively concerned in the preceding series. This series was one of eight volumes, which appeared in the years 1851 to 1858.

It was now that our own Union, then the West Riding Consolidated Naturalists' Society, appeared on the scene. It had no sooner established its own existence than, at its second meeting, it discussed the need for a periodical, and a resolution was passed that one be established under its auspices, and eventually in 1864 a new (fourth) series of "The Naturalist" was commenced and printed at Huddersfield.

The title and copyright were transferred to this by the Rev. F. O. Morris. This series, every number and volume of which bore the sub-title, "Journal of the West Riding Consolidated Naturalists' Society," and edited by Messrs. George Tindall and C. P. Hobkirk, lasted for two volumes and an incomplete third volume, from May, 1864, until it collapsed with the number for May, 1867, from want of adequate support.

The next (or fifth series) was called "The Yorkshire Naturalists' Recorder: Journal of the West Riding Consolidated Naturalists' Society," and lasted a year. It was printed, published, and edited at Wakefield, July, 1872, to August, 1873. It contains the only history of the West Riding Consolidated Society we have.

Direct action was again taken by the Society a couple of years later for the revival of the magazine, and in response to a resolution passed at Rastrick, on 12th June, 1875, a sixth series was commenced, printed and published at Huddersfield, and edited by Messrs. Charles P. Hobkirk and G. T. Porritt, as the "Journal of the West Riding Consolidated Naturalists' Society."

Under this editorship it assumed a more scientific character, and became much more strictly local in its scope. This series, published from August, 1875, to July, 1884, ran to nine volumes.

There was no break in the time when the seventh series replaced its predecessors in August, 1884, but the place of printing and publication was transferred to Leeds.

Mr. W. Eagle Clarke and myself became editors, a post from which the former retired in 1888, leaving me in sole charge till 1892, when Mr. Edgar R. Waite became my colleague for one year. My own editorship came to an end at the close of 1902, and the Journal is now in the capable hands of Mr. T. Sheppard and Mr. T. W. Woodhead.

During the whole of its existence "The Naturalist" has been a valuable medium for recording the observations and discoveries of Yorkshire naturalists, and forms a storehouse of information, which no Yorkshire investigator can safely ignore.

Our Transactions, too, take their stand along with our magazine, and have especially afforded the means of publishing lists and monographs too bulky for a magazine.

One volume consists of the "Flora of West Yorkshire," by F. Arnold Lees, the most complete work of the kind in existence. We have also published nearly the whole of the second edition of Baker's valuable work on North Yorkshire, which we hope may soon be completed. Another volume is devoted to the "Alga-Flora of Yorkshire," by W. West and his son G. S. West, and it will not be long before the companion work the "Fungus-Flora of Yorkshire," by Geo. Massee and Charles Crossland, follows it.

The "List of Yorkshire Lepidoptera," by Mr. G. T. Porritt, of which we have just published a second edition with supplement, is also one of the most complete works of which any county can boast.

Of works which are appearing in our transactions, but are yet incomplete, we may cite Messrs. Taylor and Nelson's "List of Land and Freshwater Mollusca of Yorkshire," which is written on a most admirable and exhaustive plan; the "Birds of Yorkshire," which Mr. Eagle Clarke's early removal to another part of the kingdom prevented being finished; the "Yorkshire Carboniferous Flora," by Mr. Robert Kidston, which is complete so far as known investigations go; and the Rev. W. C. Hey's "List of Yorkshire Coleoptera," as all being works of great value.

My review ought to include a sketch of the progress of research in each of the various departments of study included in our scope, but the task is a formidable one, and the exigencies of time and space prevent me. Suffice it to say, that in nearly every department of the natural sciences, the Union has been actively concerned throughout the past forty years, and the number of really able Yorkshire investigators has been remark-

able ; and that in most departments of geology, botany, and zoology, Yorkshiremen have taken a leading part.

More especially in the study of geographical distribution and the influence of environment upon life and variation have our naturalists been pre-eminently successful.

It was to a Yorkshireman, Hewett Cottrell Watson, that we owe the beginning of the study of topographical distribution of British Plants; to Mr. Gilbert Baker and Mr. F. Arnold Lees the carrying on of similar research; and in our own time we owe to one of our members, Dr. Smith, an entirely new departure in the mapping of vegetation.

Of cryptogamic botanists we can point to men like Mudd for the lichens, Spruce and Slater for the hepatics, Bolton, Soppitt, Massee, and Crossland for the fungi, Hobkirk and Braithwaite for the mosses, as the authors of works of high importance, particularly Dr. Braithwaite's just completed "Monograph," and Mr. Massee's valuable handbooks of British and of European fungi.

In conchology, the Yorkshire group have for the past thirty years led the kingdom. In Leeds, the "Journal of Conchology" was established, and the Conchological Society of Great Britain and Ireland was founded, and it is in Leeds that the most important monograph of the British Land and Freshwater Mollusca is now being brought out by the public spirit and indefatigable activity of Mr. John W. Taylor.

In ornithology, the names of Dresser, Seebohm, Clarke, Cordeaux suffice to demonstrate that some of the principal monographs owe to our county their origin.

In entomology, too, we have always had numerous, able and indefatigable workers, and in Westwood, Spence, Porritt, Dunning, Denny, and others, the authors of works which rank as classics.

In geology, I have already mentioned some of the giants of the old time, and of late years we have not lacked men of their own calibre. Green, Hudleston, Sorby, Dawkins, Tiddeman, Kendall, are all names worthy of a place in our remembrance.

It is only in the study of marine life, a strange phenomenon in a county with such a varied coast line, that we have never had any systematic investigators.

There are many and various minor topics which, in a full and detailed history of our Society would be worthy of mention, but would be quite out of place with the limited amount of time available for a spoken address.

A few words as to our scope, and to our scientific attitude as a body, may not be out of place.

Our objects are two-fold, social and scientific, and I will take them in the inverse order of their importance.

Our secondary object is to encourage and facilitate friendly intercourse and mutual co-operation amongst persons interested in the advancement of the natural sciences.

It is for this reason that we have excursions, and that we pay so much attention to the social aspect of our annual meetings.

It is for this reason also, in the main, that we visit in succession all the nooks and corners of our large field of operations, and that our annual meetings are not restricted to any one place.

In this way it is that we have been successful in keeping our naturalists in close touch with each other's work, and in affording a continual stimulus to progress and activity among the workers.

In this way also, as Mr. Porritt pointed out in his Presidential Address of 1900, it is that we have been successful in breaking down class distinctions, and making our meetings occasions on which naturalists of all grades of life meet on common ground.

As the Rev. William Fowler also pointed out in his address, we have given naturalists the opportunities of making new friendships and cementing old ones.

The effect of the stimulus we give by our peripatetic movements through our county is well shown by the development of the various societies, especially in the Norh and East Ridings.

As stated at the commencement of this address, the original home of naturalist societies in Yorkshire was a limited area in the extreme south-west, and at the time of the Union assuming its present title, and extending its area so as to cover the whole shire, there were practically no natural history societies existent elsewhere than in the West Riding, excepting at Richmond.

There was no lack of able and enthusiastic individual naturalists in the other Ridings, but the few societies which ever had existed had died out.

But the visits of the Union to these Ridings had immediate effect, and strong societies were founded in various places.

One in particular was at Malton, where a society was at once started on the occasion of a visit of the Union to that district. Others were in like manner founded at Scarborough, Pocklington, and Middlesbrough, and an old one revived into new vigour at Thirsk.

Even at Hull, which is now the headquarters of the Union, there was no society existing in 1877, but since then no less than six different societies have been formed for the purpose of joining the Union. The first of these was but a phantom at the time, and nothing more was heard of it. Of the others, a process of judicial amalgamation produced the two strong organisations which now represent Hull in the Union.

Examination of our Minute Books shows that since 1877 no less than seventy societies have been associated with us at one time and another, and this number would be still greater if we were to include the previous fifteen years. The number of societies now in the Union is thirty-one, all the other thirty-nine having

either ceased to exist or amalgamated with others. It is curious that no society has ever survived its secession from the Union for more than two or three years.

As regards one primary object, the thorough and systematic investigation of the fauna, flora, and physical features of the county of York, it is implied that our scope includes all the sciences of which locality is one of the essential elements. Sciences like mathematics, which are absolutely independent of locality, sciences like astronomy, for which locality means nothing more than a suitable medium for observation, are excluded from our purview; but on the other hand, not only do zoology, botany, and geology come within it, but also such sciences as meteorology and certain aspects of archæology and philology always provided that the students of these branches of research exist among us.

Concerning our methods of study, our true function is not an educational one, but one of original research at first-hand, and the publication of results. The only educational aspect of our work is that in which the observer teaches himself by his observations, and in which original workers influence each other.

In other words we, and societies like ours, form the field army, the extended skirmish line, in which each individual worker is brought into close and intimate contact with the living facts of nature.

We leave the task of training the recruits from whom future observers will arise, to the schools, colleges, universities, who are better equipped for such a task. It is our business to observe facts, closely and in detail, to note their relationships to each other, and to place them on record exactly and methodically .

And particularly, as Sir Michael Foster pointed out to us in his address of 1898, it is our function to preserve the field naturalist observing the inter-relationships of natural phenomena in the open, rather than the technical operator working in the laboratory.

Our publications then,our Transactions and the "Naturalist," are for the publication of the actual facts that we observe, the lists with full and detailed notes, and should be storehouses filled with the material which future investigators may need for comparison and for reference. Articles intended for teaching purposes, elementary expositions of known facts, may well be left to the numerous magazines which exist for such purposes.

In another direction our attitude has always been one of preservation, not of destruction. We have exerted ourselves for the preservation of our fauna and flora, persistently discouraged all ruthless destruction and damage of any kind, supported all protective legislation, and, on one occasion, in conjunction with efforts of Sheffield and the Sheffield Societies, our petition to Parliament was instrumental in saving Maltby Common from

enclosure, and thereby preserved one of the breathing spaces so necessary for a populous district.

There is but one drawback to our success, and I should be wanting in my duty were no allusion to be made to it, which is that, in spite of the considerable scientific success we have achieved, the Union has never received from the naturalists and the gentry of the county the full amount of support in the way of membership that we might reasonably have expected, and consequently of late years we have been crippled in our usefulness by financial stress. With so many and diverse ramifications of our work, it is impracticable to avoid considerable expense of administration in spite of the severest economy.

The county abounds in persons interested in the various branches of natural science, and well able to support the Union by becoming full members.

Two concrete statements may be made in this connection. One is that, on referring to the latest part of our transactions, which is a most valuable contribution to its subject, we find a list of forty specialists in the subject, of whom no less than sixty per cent. are not members of the Union. Again, is it not reasonable to suppose that great cities like Leeds and Sheffield could easily yield us a hundred or a couple of hundred members each, and other towns in proportion, instead of the very much smaller amount of support that we do receive?

I should be exceedingly pleased to learn that my successor in the secretariate receives much more generous support in this respect than ever it was my fortune to receive, and I hope that these words may not fall on stony ground.

One reference to our area of investigation, and I have done. One very potent cause, which has contributed as much as anything else to the success of the principle of federation with us, is the nature of the county which we have to work, and the resultant character of the Yorkshireman who has to work it. Federations have existed elsewhere in Britain, but with no great amount of success. Their constitutions have been too artificial, their boundaries and areas too vague, and an adequate sense of patriotism wanting.

But Yorkshire as a county is unique in Britain, if not so absolutely, by reason of its extent, its position, and the wonderful diversity of its physical character.

Indeed, any history of our Union for which time and space were adequate would be incomplete without a chapter discussing the subject of "Yorkshire as a Field for Scientific Research," a most alluring topic.

Not merely is Yorkshire our largest county, and, as old Michael Drayton sang in the Polyolbion,

> A Kingdom that doth seem,
> A Province at the least,
> To them that think themselves no simple shires to be,

but it is self-contained in a remarkable degree, and withal not too large an area for convenient working.

Our boundaries are definite, clear, and unmistakable, and within these boundaries is embraced a wonderful diversity of soil, climate, and physical configuration, of animal and vegetable life, and it is in verity and truth quite a perfect epitome of the island at large.

Our river systems are in the main our own, complete from source to mouth, from the springs and little rills on our own lines of hills down to their embouchure on our own coast-line.

Our geologists have the opportunity of studying nearly all the formations known in England, only the older volcanic and the newest eocene strata being absent, consequently our botanists and zoologists are able to observe species in all kinds of soil and situation. Even our smoke-begrimed manufacturing district, unlovely as it may appear, gives us on that very account the opportunity, only elsewhere afforded in Lancashire, of studying such phenomena as that of melanic variation in lepidoptera and we must not forget that here, where the struggle for life of our indigenous plants and animals against adverse conditions is keenest, is the region where the Union itself had its birth.

Our position in the island of Britain, combined with the diversity of physical aspect, enables us to observe the mingling of northern and southern forms in the same district. So that here in Yorkshire where the noctule, the nightingale, the nuthatch, the dormouse, and the Kentish snail find their northern limit, we also find the dunlin and the curlew have their most southerly breeding-places, and the beautiful butterfly *Erebia medea* reaches the southern limit of its range. And philologically, as Prince Lucien Bonaparte states, the dividing line between the northern and southern forms of English speech runs across mid-Yorkshire.

Meteorologically we enjoy all varieties of climate, from the cold and moist valleys of the Cleveland, Swaledale, and Teesdale hills to the hot plain of York, and the comparatively rainless coast-tract of Bridlington Bay.

In position and character again, our coast-line, with the tallest cliffs in England at Boulby, the matchless headland of Flamborough with its wondrous bird-life, and the low sand-hills of Spurn and Kilnsea, afford our ornithologists splendid opportunities of observing bird-migration, and our geologists a series of fine exposures of succesive groups of strata.

No wonder that with such a tract of country available for our investigations, we may, on the whole, look back with satisfaction on our past history, and survey the results achieved by our workers; and that we may feel a justifiable degree of pride in the goodly heritage which God hath granted unto the Yorkshireman.

1913, March.

JOHN W. TAYLOR.

DOMINANCY IN NATURE

and its correlation with
Evolution, Phylogeny,
and Geographical Distribution.

Presidential Address delivered at the
51st Annual Meeting of the
Yorkshire Naturalists' Union,
at the Royal Institution, Hull.

DOMINANCY IN NATURE

AND ITS CORRELATION WITH
EVOLUTION, PHYLOGENY, AND GEOGRAPHICAL DISTRIBUTION.

JOHN W. TAYLOR,

Author of the Monograph of Land and Freshwater Mollusca of the British Isles.
President and Honorary Life Member of the Yorkshire Naturalists' Union;
Ex-President and Honorary Life Member of the Conchological Society
of Great Britain and Ireland;
Ex-President and Honorary Life Member of Leeds Naturalists' Club
and Scientific Association;
Membre Honoraire de la Societe Malacologique de France; etc.

(Presidential Address delivered in the Lecture Hall of the Royal Institution, Hull, at the 51st Annual Meeting of the Yorkshire Naturalists' Union, Dec. 14th, 1912).

Before addressing you on the subject upon which I have undertaken to speak to-night I wish to avail myself of the opportunity to acknowledge and to express my appreciation of the honour conferred upon me by the selection of myself as President of so important a scientific organization as the Yorkshire Naturalists' Union.

During my term of office I have endeavoured to show practically my appreciation of this flattering recognition of my scientific labours by the faithful discharge of every duty devolving on the position, by attending not only every official meeting of the Union but also every sectional meeting of which I had cognizance.

In selecting Dominancy and its influences as the topic of my Valedictory Address, I have been to some extent influenced by the informally expressed wishes of many members and also because my own special study, the Land and Freshwater Shells of this country involved the investigation and consideration of the general and far-reaching laws underlying the problems of Evolution, Dominancy and Geographical Distribution.

The subject of Dominancy in Nature and its potentiality and influence on all organic life is receiving more and more study from the thoughtful and advanced investigator, and its acceptance implies not only a belief in the superiority or ascendancy of certain species over their allies, but that species or groups exhibiting Dominance of the highest order are to be regarded as the latest products of evolutionary activity, and as occupying the region where the creative force is most strongly exercised.

It also furnishes, in conjunction with great numerical increase, the propelling power in the enforced migrations of the weaker and more archaic forms of life, and is thus a controlling factor in geographical distribution, for it is conceded by most naturalists that food, temperature, or situation, in themselves, are insufficient to account for phenomena which, without depreciating any actual effects due to

climatic or physical changes, may be more satisfactorily explained by the compulsory migrations, due to the persistent and stern struggle for existence, whose results are displayed not only by the extirpation of species, but by the weaker forms which have been worsted in life's struggle being compelled to adopt aquatic life, or to seek refuge by the sea-shore, on mountain-tops, in dense woods, or on barren moors, the whole aspect of the plant or animal becoming more or less modified in accordance with the surroundings it is compelled to endure.

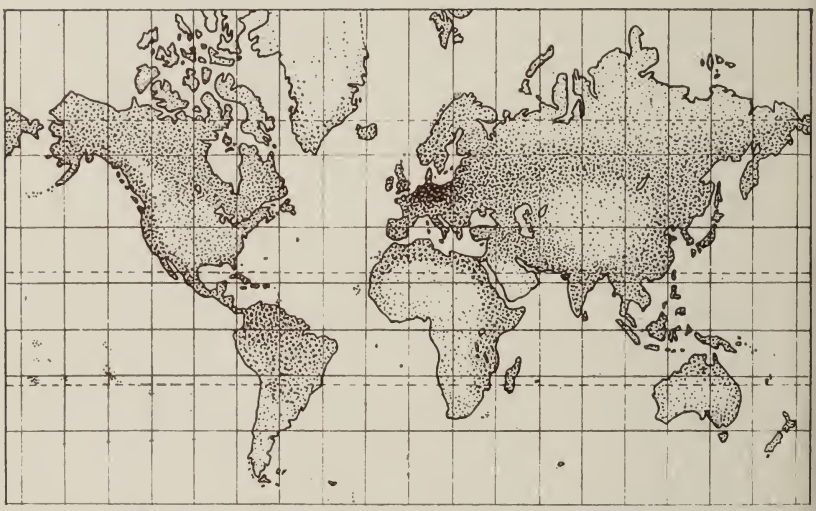

FIG. 1.—Map illustrating the approximate relative degrees of dominancy of the various regions of the world. The darkest shades indicates the most dominant areas and the graduated lighter tints denote the lessening dominating power of other regions.

The influence of this competition in the evolution and advancement of every kind of organized life from man to monad is quite indisputable, and the erstwhile dominant families or genera whose metropolis is now in other countries, formerly inhabited Europe, but have long ago been expelled therefrom by the competition of superior groups or species—thus the lemurs, the tapirs, the giraffes, the hippopotamus, the elephants, the marsupials, the apes, the monkeys, etc., were once all European, but have since been scattered over the earth, and now live in the most distant countries, being replaced in our area by the development of the more advanced organisms which have gradually expelled them, and as competition acts in the way of preserving the most improved forms, each new species or genus will tend to eventually take the place of its own parent form and also that of others less advanced.

Dominancy in the highest degree is also testified by individual abundance, great plasticity or variability, activity in evolving new forms, as well as by geographical position and continuity of the area of distribution, and these attributes are the especial endowment of the inhabitants of the Palæarctic region, the phenomenon culminating

in North Central Europe ; and that this is so is demonstrated by the acknowledged pre-eminence of its organic life, which may be partially attributable to the diversity of its surface, and the bracing, yet mild character of its climate, consequent on its permeation by the seas, and the great prevalence of genial westerly winds bringing moisture and warmth in winter from an ocean whose temperature is modified by the Gulf-stream, while it is free from the enervating and depressing influences of the great extremes of temperature characterizing Siberia, Central Asia, and even Eastern Europe.

These invigorating conditions of North-Central Europe and the acknowledged superiority of the life already existent there, tend to evolve a still higher degree of dominating power in the new species which arise, and endow them with a marvellous faculty of extending their range in every direction, to the detriment and eventual expulsion or extirpation of such species as they may conflict with.

This superiority or increase of dominating power being probably not necessarily due to any external morphological change but to a greater development and concentration of the nervous system in animals and of its analogue in plants, endowing animal life with a more active and varied intelligence and probably also with a greater bio-chemical power of extracting nourishment from food, while in plants the increased development of what may be regarded as a rudimentary nervous system enables each improved plant to more

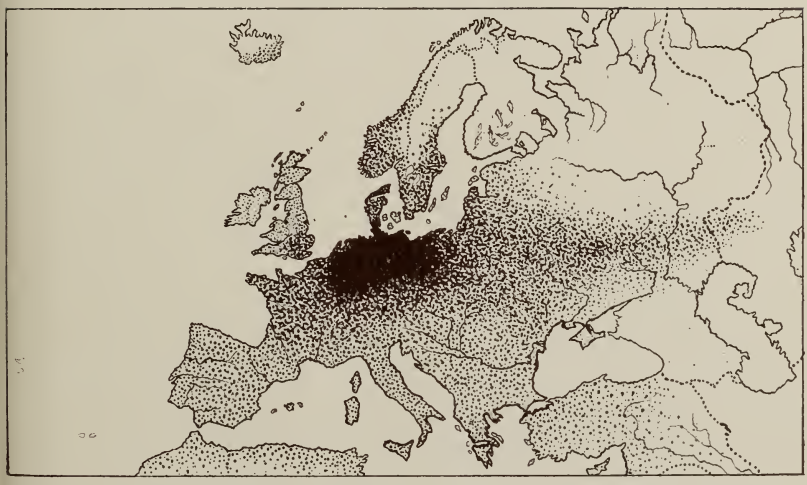

FIG. 2 —Map illustrating geographical continuity of distribution and the occupation of the primary evolutionary area by the latest evolved and most dominant species, as by the Pentatæniate Helicidæ (*Helix pomatia*, *Helix nemoralis*, etc.).
The evolutionary region is approximately indicated by darker shading.

readily perceive and adjust itself by purposeful, mechanical or chemical changes to the varying peculiarities of its environment, and by more quickly perceiving and absorbing nutriment or taking fuller advantage of any beneficial influences and avoiding those of an hurtful or

deleterious character to acquire advantages over its competitors, which will be transmitted to its descendants.

The probability of the existence of one great evolutionary centre from which the chief types of life have arisen was foreshadowed many years ago by the late Dr. S. P. Woodward, who thus expressed himself: "Specific centres are scattered thickly over the globe, those of genera are more thinly distributed, and the points of origin of the larger groups become fewer in succession, until we have to estimate the probable position of the scene of creation of the primary divisions themselves, and are led to speculate whether there may not have been some common focus—the centre of centres—from which the first and greatest types of life have emanated."

Fig. 3.—Map illustrating the expulsion from the primary evolutionary area of the earlier evolved species or genera and the initiation of discontinuity in their distribution, as exemplified in the subdominant molluscan genera *Helicella*, *Helicodonta* and *Helicigona*.
The paler evolutionary region is indicative of the expulsion of the subdominant genera.

The accuracy of the location of the chief evolutionary area of the world in North Central Europe—or in its vicinity during other arrangements of land and water—is further shown by the greatest advances of faunal and floral life being restricted to this region, which is, and has been, the most active focus of evolutionary change, while the fact that this highly endowed area is surrounded on every side by life of gradually diminishing dominancy or inferiority confirms its truth, and this applies not only to every other form of life, but is equally characteristic and equally true of man himself, as North Central Europe is the home of the Teutonic race, the latest evolved people and according to Canon Taylor, the great ethnologist, is surrounded on almost every side by the various brachycephalic nations of Celtic affinities whom the Teutons have displaced and superseded, who as Lithuanians, Slavs, Celts, Umbrians, Latin and Doric Greeks, Helvetians, Belgians, Danes, Austrians, Bavarians, etc.,

occupy the countries immediately adjacent thereto, but are more or less thoroughly permeated by the expanding Teutonic element, and these various peoples of common origin have adhered more closely to their primitive type of language than the Teutons, who have departed to a greater extent from the primitive or archaic Low German language which is now chiefly spoken on the Frisian Islands and in certain Dutch districts on the outer fringe of the Teutonic region.

Eastward we meet with this gradually diminishing dominance, and although it has been suggested that at some previous epoch the highlands of Central Asia were of a much more moderate elevation than at the present day and that the climate was milder than now, yet the region by its geographical position must always have possessed an extreme continental and dry climate and at the present time we find there a fauna which has been compared with the Central European life of the Tertiary period.

On the West we have a more gradual but still quite perceptible waning of ascendancy, and this is clearly shown also in the celebrated thesis by Prof. Forbes in which the geographical position occupied by his Germanic, Kentish, Gallican, and Lusitanian areas in relation to North-Central Europe are in exact correspondence with the chronological order he assigns to them, the Lusitanian being the most ancient group and now furthest removed from the active evolutionary centre, while the Germanic is the most advanced and dominant and consequently the most modern group and therefore still occupies the area of highest evolutionary activity and dominating power ; the Kentish and the Gallican groups of species occupy an intermediate position geographically and chronologically ; while in the Eastern United States we have certain sections of its fauna and flora comparable with those of the most primitive countries of the world, and immeasurably inferior to the life of Europe.

To the South lies the Mediterranean region and Africa, separated from the vigorous northern races by lofty and almost inaccessible mountain ranges. South of the dividing mountains we find representatives of groups long ago compelled to leave the central region ; some of them with an origin so remote that no close affinities can be traced with any living groups, and there is generally a deterioration of vigour, and many relics of ancient and even Tertiary life are still existent there, and this applies not only to snails and worms, but to plants, and doubtless to many other forms of life.

The African region, south of the Sahara, is indeed primitive, and has long been a sanctuary for many strange, curious, and ancient forms derived from Europe during the Mesozoic period and in repeating this I do not overlook Prof. Osborn's opinion that Africa has been a great centre of independent evolution.

In the North we have the same reduction of dominating power ; the species now inhabiting the extreme northern lands being evidently such as have from time to time been compelled to take up their abode in these inhospitable and frigid wastes, and have not from choice

selected such inclement places for their abode ; the Polar Bear, that incarnation of life in icy regions, has no love of cold, but, on the contrary, revels in sunshine and warmth.

Arctic and Alpine life consists of the more primitive organisms originally belonging to, and gradually acquired from, the general fauna and flora of the more temperate adjacent regions and which are added to from time to time by the addition of other refugees from the unending and relentless struggle for existence for the more favorable positions that is constantly in operation.

Mr. Ball has shown the great probability of Alpine plants being derived from species inhabiting the surrounding plains, and conversely, therefore, the improbability of Alpine species diffusing themselves over the neighbouring less inclement country as has been so often and so erroneously declared ; and this is equally true of the Arctic races and of all life, and as Darwin has so poetically expressed it : "as the tide leaves its drift in horizontal lines, rising higher on the shores where the tide rises highest, so have the living waters left their living drift on our mountain summits, in a line rising from the Arctic lowlands to a great altitude under the Equator. The various species thus stranded may be compared with the savage races of men driven up and surviving in the mountain fastnesses of almost every land, which serve as a record, full of interest to us, of the former inhabitants of the surrounding lowlands."

Geographical distribution when properly understood not only discloses the results of illimitable ages of evolution and of endless and innumerable conflicts between the numberless species which now exist or have existed, and resulting in the extinction or migration of the weaker species and genera and the present arrangement of the life-groups of the world as the outcome of the whole past history of the earth, but reveals, in connection with dominance, the probable phylogenetic line of descent of the various species and groups, indicates the direction of the migratory movements, and points to the seat or area of preponderating evolutionary power and is, therefore, a very important feature in the study of Nature, being, as the immortal Darwin has declared, "a keystone of the laws of creation."

Some scientists, agreeing with the late Prof. Forbes, apparently regard the assumed area of evolution or original home of even the most ancient and primitive genus or species as being where its present-day metropolis is placed, from whence they are assumed to be extending their range, but to which they are indissolubly bound, as that author in his famous memoir describes the relative geographical positions of the various European floras he distinguished and though his argument is essentially based upon migration or dispersal he has reasoned from the present day position of the constituent species of his various regions and assumed them to be unaffected and unaltered by the enormous changes that have taken place since Miocene times.

This is, however, eminently untenable and misleading, for it is now almost universally conceded that all existing faunas and floras merely exhibit a passing and temporary phase in the earth's history and are and always have been throughout countless ages in process of continuous although slow and gradual migration, this migration being always in a direction away from the evolutionary centre and due not only to increasing numbers but to the genesis of more highly endowed species, which eventually drive their progenitors or predecessors from their native regions, the dispossessed species encountering in their retreat many diverse and enervating conditions of climate, etc., resulting in a loss of some of the initial energy or vitality engendered in their ancestors, by the invigorating conditions under which they were evolved, and, therefore, to speak of such weaker species diffusing into and occupying areas dominated by the more advanced and stronger life of Europe is to fail to appreciate the efficiency of the organic barrier they form.

North-Central Europe is confessedly the metropolis of all the most advanced types of animal and plant life of the world and cannot be successfully and permanently occupied by the organisms of the weaker adjacent regions, all of which had probably been ages ago expelled therefrom ; there is, therefore, little or no interchange of life between the stronger and weaker countries, though the actuality of such mutual interchanges has been frequently affirmed.

The various ancient species now isolated in the more remote and scattered districts of these islands are representative remnants of life now dominant in other and weaker countries and are to be regarded as the last lingering relics of a former general occupation and their presence must not be interpreted as indications of a former hypothetical invasion of isolated areas from Lusitanian, American or other primitive regions.

The distribution and dispersal of species is a process governed by universal and immutable law, and not, as some aver, accomplished by chance, or by the scattering at random by wind or ocean currents of species and individuals, and although it cannot be denied that anemophilous and certain other plants may extend their range to regions where they did not formerly occur, if the wind or water-borne seeds alight on unoccupied ground, or on land occupied by species much inferior in their dominating power ; yet it cannot be too strongly emphasized that weak or primitive plants or animals cannot effect a permanent footing and extend their range on ground monopolized by the more modern and highly endowed species.

Although the natural tendency in the dispersal of life is towards uniform diffusion, and comparable to the concentric rippling caused by throwing a stone into a pool of water, resulting in a series of waves, the later ones taking the places of those previously formed, and the first produced being the furthest removed from the source ; so in like manner the later evolved species or genera dispossess their predecessors, and the earliest evolved are the furthest removed from the area in which they arose.

This uniformity of dispersal from the evolutionary centre is, however, in Nature hindered by physical and other barriers, and, therefore, tends to follow certain definite paths which have throughout recent geological times been obviously determined by the direction and character of the great mountain chains, which in Europe and Asia are disposed chiefly in a latitudinal or horizontal direction, or from east to west, while on the American continent the direction is diametrically different, the great mountain ranges running longitudinally or from north to south.

Fig. 4.—Map illustrating the positions, general arrangement and directions of the great mountain ranges of the world, to show their influence in determining and defining the paths of life dispersal from Europe.

In Europe, the Pyrenees, the Alps, the Carpathians and other mountain ranges more or less effectually hinder or limit diffusion to the Mediterranean region and beyond, while the deserts and bleak and lofty table-lands of Central Asia offer almost impassable barriers, so that the easterly migrants by the northern route are compelled to traverse Russia, by a route passing through the South Central Provinces and entering Asia to the south of the Ural Mountains, and to continue their march along the comparatively fertile tract to the north of the inhospitable montane and desert region.

On reaching the Pacific Ocean the migrants diverge, a portion turning north and crossing by a formerly existent Aleutian land-bridge to North America, while the remainder turn southward, passing through China and giving off a contingent which enters India, while the larger number enter Siam and neighbouring countries and spread over the equatorial Malayan islands, Australasia, etc.

The section which crossed to North America dispersed towards the south, this direction being necessitated by the longitudinal direction of the great mountain ranges, the migrants eventually reaching and traversing Central America and penetrating into and

occupying South America and also probably contributing its quota to the life of the islands and continent of Antarctica. Direct access to the great plains of Eastern North America being cut off by the lofty Rocky Mountains and other important ranges, an entry thereto is made by a portion of the migrants by way of Yucatan and Florida, and they also occupy the West Indian Islands, which were formerly more or less connected together. Those entering Florida became diffused over the Eastern United States, the weakest races being eventually driven to occupy the Central or Missourian region.

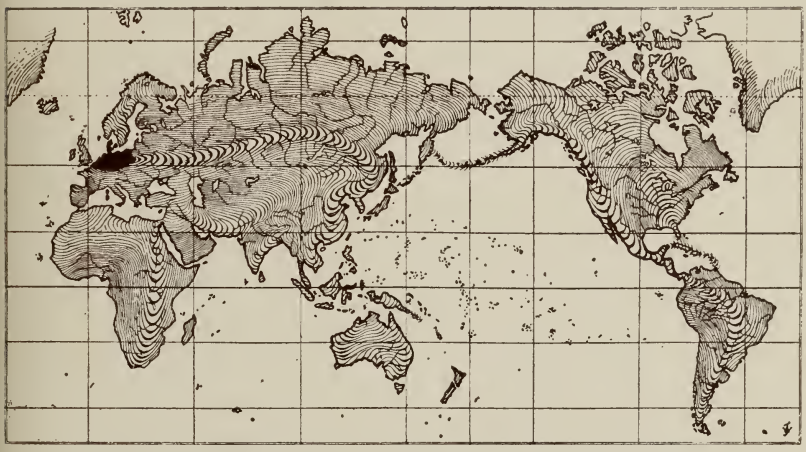

FIG. 5.—Map showing the approximate routes traversed by the *Helicidæ* and other organisms by which life has probably overspread the earth from the assumed evolutionary area.
The stronger waves represent the main courses of the migratory streams, the closer rippling indicates the relative slowness of the advance.

Another important route is travelled by those species which have occupied the Eastern Mediterranean region and have crossed into Asia Minor, spreading towards the east by way of Afghanistan and Persia and only a few reaching India.

Others from Asia Minor entered North-east Africa, passing along its northern coasts or up the valley of the Nile to the south of the Sahara desert and opening up the whole African continent to colonization. Other routes directly connecting Europe with Africa formerly existed and would also contribute in the diffusion of European life.

A north-western route, formerly connected Europe with North America by a Tertiary bridge, but its apparently short duration prevented any but northern species taking advantage of it and the comparatively modern date of its existence has prevented an extended diffusion of some of the plants, mollusks, earthworms, etc., assumed to have reached America in this way.

Although climatic barriers are generally considered one of the chief factors in limiting distribution this cause is not nearly so effective as is usually supposed, and although any immediate transference,

especially from a warm to a cold climate, would probably prove fatal in a majority of cases with most organisms, yet the gradual changes encountered during natural migration are far from insuperable; indeed, according to Darwin, acclimatization is readily effected during a long course of gradual migration, species being probably limited in range more by competition than by climate.

Dr. Scharff accepts the reality and seriousness of this life struggle and recognizes the forcible restriction and retreat of the earlier evolved and more primitive forms to Arctic and other weaker regions and instances the Arctic and Alpine Hare (*Lepus variabilis*) which, though formerly overspreading great parts of the northern hemisphere, has now in European regions owing to the competition of the later evolved and more dominant European Hare (*Lepus europæus*) now been driven from its former haunts in the plains into Alpine and Arctic lands, except in Ireland, where it still occupies the plains because the European Hare has not yet penetrated there, and he remarks that "it is not the cold that has driven the Alpine Hare to the Alps, and its presence there is not, as is often supposed, a standing testimony of a former Arctic climate in Europe, but merely the necessary consequence of the weaker species being thrust into less accessible regions by a stronger rival."

That the alternate warm and cold periods which characterized the Miocene and Glacial epochs, whether these have resulted from the excentricity of the earth's orbit, the pendulation of the earth's rotatory axis, or from other causes, must be conceded to have had considerable influence on the dispersal of life, though none on the laws governing it; yet the rigours and effects of the glacial age have probably been overestimated, for in North Siberia, the very coldest region of the world, with an intensity of frost far beyond what is claimed to have existed in these islands during that period, and showing a mean annual temperature of more than 27° of frost, descending in winter to 80° below the freezing point, yet great forests exist and the very finest furs are obtained therefrom, while in Alaska forests are known to flourish even upon the actual surface of the glaciers themselves, and we cannot but regard the extreme views of some geologists on this subject as untenable, as it would seem reasonably certain that the native fauna and flora of these islands were not exterminated, but in great part persisted through the glacial age.

Mr. Clement Reid, the well-known glacialist, has declared that in the district where London now stands, the mean annual isotherm during the greatest severity of the Ice age was 30° Fahr., a temperature comparable with that of North Norway, Manchuria, British Columbia, etc., at the present day, and these are all countries which possess a comparatively rich and varied fauna and flora; while according to the studies of Prof. Neumayr and others to determine the temperature of Europe during the Ice age, based upon the present and former positions of the snow-line, it has been shown that the climate of Central Europe was probably not more than about 6° Cent. colder

than at the present time, as the snow-line at the period of greatest cold was never more than 1,200 metres lower than its position at the present day, and temperature being proved to diminish half a degree for every 100 metres of elevation.

The great aggregation in this country and in Europe during Pliocene and Pleistocene times of what are now tropical and arctic genera and the acknowledged general intermingling of the fossilized relics of reindeer, mammoth, lion, hyæna, etc., can scarcely be explained otherwise than by the acceptance of the suggestion that the climate at that period was not an extreme one, and that the extinction of species or their restriction at the present day to arctic or torrid regions is the result of competition with the superior forms and demonstrates that although species in course of ages become adapted to circumstances or hardships inseparable from the regions they may have been compelled to occupy yet we may be assured that the adoption of the hard life of the arctic regions was not a voluntary but an entirely compulsory act.

In mammals, the highly organized tiger is capable of enduring great ranges of temperature, and although long regarded as a typical resident of the torrid plains of India, is nevertheless a northern animal enduring the harsh, intensely cold and rigorous winters of Siberia; indeed, it is only within the historic period that the tiger has penetrated into India, where it was previously unknown, so that its present range extends from the torrid zone to the Arctic circle.

Dr. Scharff has also shown how little climate may affect distribution or dispersal, pointing out that although the fresh-water Tortoise (*Emys orbicularis*) is retreating southward in France and is common in Spain and North Africa, it is distinctly advancing northward in Russia and now inhabits as far north as St. Petersburg, and similar examples can be cited in almost every department of natural history.

All living organisms are subject to variation, which is the response of the organism to the features of the environment, and such response always tends to adaptation or to adaptability. Adaptability confers the power of accommodation to a variety of somewhat different circumstances, perhaps due to a greater perfection of the physiological processes. It is the highway of progress, and is inverse to Adaptation or structural modifications to accord with peculiar and strikingly different environments, so that animals or plants which have reached a high degree of adaptive specialization, and acquired a strict correlation in structure to a more or less restricted mode of life, as the adoption of subterranean or aquatic life, parasitic habits, etc., to which the structurally modified species are thenceforth necessarily restricted, as they thereby become less capable than before of further modifications to harmonize with any profound changes in their environment; thus high or excessive specialization, by limiting the power of modification to other conditions, is a retrograde process tending to degeneracy, and is an evidence of their failure in life's struggle.

Some scientists are inclined to regard the highly specialized species in which elaboration of structure or function has been carried to the marvellous extent so characteristic of certain tropical and archaic species, as evidences of potential dominance or superiority over the secondarily simplified forms of the European region, in which the efficiency and adaptability of their physiological processes give them a superiority which is displayed by the way in which these large and extremely specialized forms of life are being driven off by the more highly endowed European species.

Others, disregarding their primitive nature, describe the archaic and dying forms characteristic of Antarctica and other primitive southern regions, as advancing northwards and occupying districts already tenanted by stronger and more highly developed races, or even suggest Antarctica as a great evolutionary centre and source of dispersion apparently on account of many of the most primitive forms of life having found temporary sanctuary in or near the most extreme parts of the southern hemisphere and in the erroneous belief that the present day abode or metropolis of ancient forms of life indicates their real place of origin.

It is, however, highly improbable that these, the very feeblest of living species, representing groups originally inhabiting the northern hemisphere, but long ago expelled or in process of expulsion from the more northern countries by their more highly endowed successors, can extend their range to the detriment of species which are ever driving them southward to their future inevitable extinction.

That the organic life of such primitive countries is weak and impotent and quite incapable of any aggressive advance or occupation of other lands is shown clearly by its startingly rapid destruction or retreat when brought into direct conflict or competition with the stronger forms of Europe, and in a lesser degree with those of Asia, whether these be mollusks, earthworms, birds, insects, plants, mammals or man himself.

In such cases the native species rapidly disappear and the new comers take possession of the land, driving off or destroying the original occupants so that in many of these weaker countries the native mollusks, worms, birds, plants, animals and men have quite disappeared from the neighbourhood of the settlements and only the dominant European species can now be found.

For a notable instance of the marked exercise of this colonizing power, I am indebted to Mr. J. H. Ponsonby who informs me that a form of the Heath Snail (*Helix itala*), a xerophilous species which in Europe is only conditionally dominant, being more or less restricted to dry and arid lands, was some years ago unwittingly transferred, probably in grass seed, to the vicinity of Levens, South Australia, where it has now overspread hundreds of square miles on the York Peninsula, and is so exceedingly abundant that the herbage is in places white over with the countless millions of their shells.

Geology also affords very striking corroboration of the truths of geographical distribution and of the intimate connection between the community of descent and the chronological sequence of the evolution of all animals and plants, inasmuch as the laws governing the succession of life in the past are those controlling the evolution of life and its distribution over the earth at the present day; for the orderly succession of life presented in the ascending strata of our globe could be, in a large measure, reconstructed by a study of the plan of the dispersal of life over the various regions of the earth; the chronological sequence of such regions according with their remoteness or otherwise from the creative centre; and this becomes most impressive when the survey is from Europe, the location of the area of greatest evolutionary activity, and the only possible region from which such a survey showing the gradual transition from the most modern to the most ancient forms of life can be made, while its accordance with geology is demonstrated by the fossilized remains imbedded in the most recent deposits being those whose living representatives still exist in or near the European region; while those forms of life whose geographical range is restricted to isolated or desolate spots, or to countries the most remote from Europe, are of the greatest geological antiquity.

The **Mollusca,**[1] the group upon which the preceding generalizations are chiefly based, as being my own special study and apparently further advanced on this especial line of thought than most other groups, will be first considered, and I shall hope to demonstrate that their geographical distribution is in strict harmony with the serial evolution of the constituent species and genera, and will clearly indicate their probable creative centre, and also the routes by which they have attained or reached their present area of habitation.

The Helicidæ, a characteristic family of land-shells, may be taken as a representative group, not only because of their world-wide dispersal, but because our knowledge of their structure is so complete, that a scheme of classification has been based upon it, whose truthfulness as revealing natural affinities is shown by the flood of light the proposed arrangement sheds on their evolution, their migratory paths, and the resulting geographical distribution of the component genera, and this is the more remarkable, as previous attempts to establish a phylogenetic sequence in harmony with geographical distribution have always been chaotic and unconvincing.

A truly natural classification is, therefore, of indispensable value, as revealing the bonds of relationship and establishing the community of descent of all life, which is thus shown to be linked together by chains of affinities, and although many of the larger groups are now broken up and widely separated by immense tracts of land or wide oceans, yet each generic type, each ordinal type, and even the still larger and more important groups are genetically

1 For a fuller account of distribution, evolution, etc., of the *Helicidæ* see "Monograph of the Land and Freshwater Mollusca of the British Isles," vol. i.

related, and at one time had a continuous and compact range, and must have emanated from the same ancestral source.

The *Helicidæ* are divided by Dr. Pilsbry into four chief groups: *Belogona siphonadenia*, *Belogona euadenia*, *Epiphallogona*, and *Protogona*; while a more generalized group, the *Haplogona*, which stand near the common ancestor of the *Helicidæ* and certain other families, will also be considered.

The BELOGONA SIPHONADENIA exemplify the highest development attained by the *Helicidæ*, and are dominant throughout the world, possessing a most remarkable power of accommodation to almost any conditions, evidenced by an almost unique capacity for colonization, and an extraordinary faculty of supplanting and driving off the indigenous or native species of every other region, an endowment they share with the human race of their native country.

The highest development of this section is in North Central Europe, the most advanced region in the world, and the theatre of the highest development in plants and animals, from whence they are spreading in every direction that the physical barriers will allow; the more ancient and primitive species of the group have spread beyond the limits of Europe, having crossed the Asiatic continent, and now overlap and mingle with the rear of the less dominant Euadeniate group which preceded them.

The BELOGONA EUADENIA are an earlier form of the last section, differing in the less perfect dart apparatus and sacculate glands, and at the present day have their metropolis in China and Eastern Asia, though, undoubtedly, originating in the European region prior to the Siphonadeniate species, by whom they are being gradually expelled therefrom, although many species are still found along the migratory track, and a single species of *Eulota*, one of the latest evolved of its group, still lingers in Europe, a solitary representative there of this formerly dominant race, whose former presence in Europe is also indicated by the intimate relationship existing between tertiary and living European species and certain Chinese forms. Though thus retreating from Europe, its earlier evolved members, typified by *Helicostyla*, with its primitive dart apparatus, have penetrated to New Guinea and the Solomon Islands, and overlap and compete with their more archaic predecessors, the *Epiphallogona*.

Although now a waning group in Palæarctica, it is still the most dominant Helicidian group in the New World, where it is found along the Pacific coast of that continent, penetrating to South America and the Greater Antilles.

The EPIPHALLOGONA are a still more ancient group, and though quite destitute of the love-darts, etc., so characteristic of the two preceding groups, blends imperceptibly with them. It was the earliest group to acquire the Epiphallus, an organ in which the male element is collected and consolidated and transferred bodily when pairing.

The *Epiphallogona*, by their distribution and structure, plainly show themselves to be the predecessors of the *Euadenia*, and evidently arose

in the same European region, and though now completely expelled therefrom, and to a large extent from Eastern Asia, where their rearmost representatives, including the most modern and recently evolved genus *Ganesella*, mingle with the advancing Euadeniates in the country between India and Japan; their metropolis is, however, now situated in the islands of the Malay Archipelago and in northern Australia, the most archaic genera, *Camœna*, *Obba*, *Hadra*, etc., leading the advance and coming in competition with the rearmost of the *Protogona*, the still more primitive group which preceded them.

In the New World the *Epiphallogona* preceded the *Euadenia* over the Aleutian bridge, and passed southwards, followed by the *Euadenia*, by whom they are driven forwards, until at the present day the *Epiphallogona* occupy Central America, the Greater and Lesser Antilles, and Northern South America, often associated with the later evolved and competitive *Euadenia*, but extending beyond them in every direction, except on the north, the direction from which the newer and stronger race are advancing.

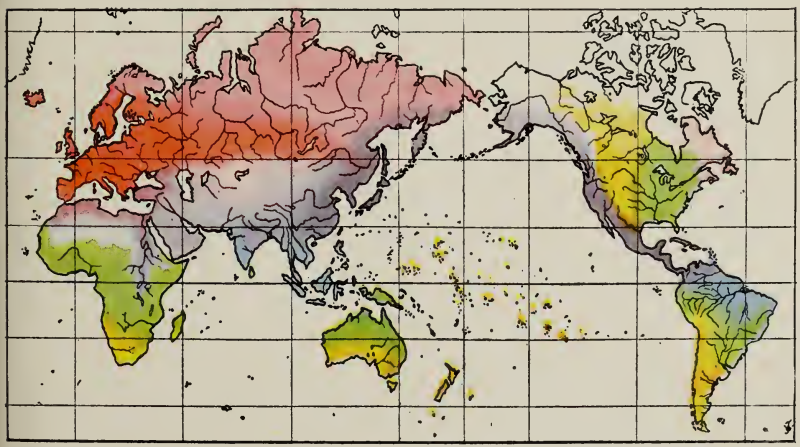

FIG. 6.—Geographical distribution of the chief Helicidian families showing the areas they now occupy and—studied with FIG .5—the chronological succession of their evolution, the correlation of their phylogeny and geographical distribution, and also indicating approximately the probable evolutionary area and migratory paths by which their distribution has been attained.

YELLOW represents the areas to which the predominance of the *Haplogona* is now restricted; GREEN, those dominated by the *Protogona*, who are encroaching upon the haplogonous area, and are themselves being slowly over-run by the *Epiphallogona*, who regions are coloured BLUE; the areas of the *Belogona Euadenia* are distinguished by PURPLE, their advanced guard mingling with the rear of the *Epiphallogona*, which they are gradually driving forward, while the *Belogona siphonadenia* (RED) are in turn invading and slowly expelling the *Euadenia* from the areas they now occupy.

The PROTOGONA are the most ancient and first evolved of the Helices, and are, therefore, the most distant from Europe, their true area of origin; they possess the simplest genitalia, but are gradually and intimately linked with their improved successors.

The *Protogona* weve evolved an immensity of time ago in or near the same region as their predecessors, and have been diffused over the world by approximately the same routes; they are now completely

expelled from the Northern Hemisphere in the Old World by the pressure of the more advanced forms which have successively followed them, so that they now exist only in the most remote regions; their chief sanctuaries being regions furthest removed and most difficult of access from the evolutionary centre; these refuges are the southern portions of Africa, Australia, and Tasmania, and the more remote islands of the Indo-Malayan region.

This primitive group also apparently crossed the Behring bridge and travelled southwards, probably by a similar path to that trodden by the various races which successively followed them: on reaching Central America they overspread the whole of the West Indian Islands, and invaded the United States by way of the Floridan peninsula, occupying the whole of the Alleghanian region and the basin of the Mississippi river; while others continued on their way from Central America and entered South America, penetrating into the Argentine, and beyond the point as yet reached by the *Epiphallogona*.

The Haplogona are the most generalized and lowly of the Helicidian groups: they are not strictly Helices, but Helicoids of the simplest organization, and probably stand near the probable common ancestor of the Helicidian group. Their consequent immense antiquity is confirmed by the exceedingly wide distribution this has enabled them to attain, as representatives are found in the most remote and in the most inclement regions.

This group was, probably, the first of living *Helicidæ* to arise, and their place of origin was, probably, the same as that of the preceding groups; and though myriads of ages have elapsed since the group was dominant in Europe, where it is now only represented by a few species of the most minute size, it attains, in the weaker southern hemisphere, a great development, being more or less abundant in New Zealand, Tasmania, South Australia, South Africa, and its members are to-day the predominating Helicoids in the oceanic islands of Polynesia and elsewhere.

The *Haplogona* were, probably, the first to cross the Aleutian land-bridge from Asia into North America, and in all probability travelled by the path which their successors afterwards followed; they passed in advance of the *Protogona*, along the Pacific coast, overspreading the West Indian Islands, and entering the Eastern United States, followed by the *Protogona*, which have since compelled the bulk of the Haplogonous species to occupy the elevated and barren region lying between the Rocky Mountains and the Sierra Nevada and Cascade Mountains, where, freed from the competition of more advanced groups, a number of fine and large species have become developed.

Others passed forward through Central America into South America, and have been driven to now occupy the extreme southern extremity of that continent, beyond the point where any of the later developed and more dominating species have as yet penetrated.

The **Oligochæta** or Earthworms are perhaps, next the mollusca, the group in which a more scientific classification has allowed the significance of their geographical distribution to be appreciated and they furnish a very striking confirmation of the testimony of the mollusca, which will probably be even more complete as further evidence is obtained and the scheme of classification still further perfected.

The Earthworms are divided by Mr. F. E. Beddard, the principal student of the subject in this country, into three great groups: *Lumbricidæ*, *Megascolecidæ*, and *Geoscolecidæ*, to which I would suggest adding *Acanthodrilidæ* by raising the *Acanthodrilinæ* to family rank, a proposal based on the striking significance of their distribution.

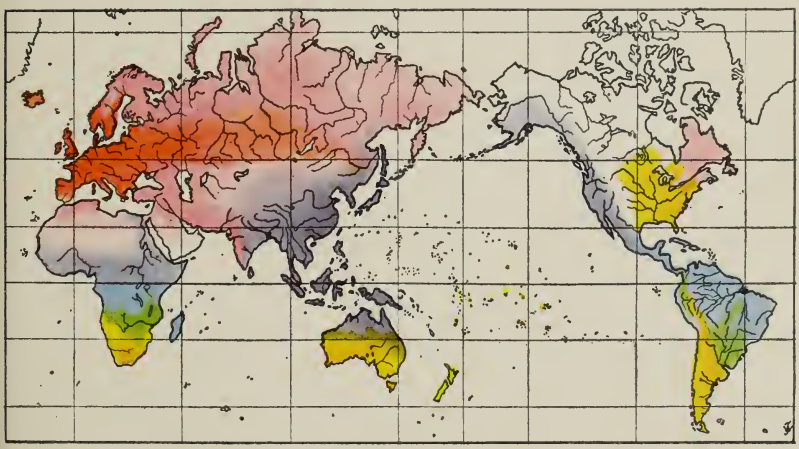

Fig. 7.—Geographical distribution of the *Oligochæta* or Earthworms, illustrating its remarkable correspondence with that of the *Helicidæ* and other life, the various areas being inhabited by groups of analogous dominating power and also indicating the probable identity of the migratory paths resulting in similarity of distribution.

The Yellow areas indicate the countries to which the most primitive earthworms, the *Acanthodrilidæ*, are now restricted and where they are still dominant. The Blue represents the regions now occupied by the stronger and later evolved *Geoscolecidæ;* the regions coloured Purple are those of the still more dominating *Megascolecidæ;* while the Red includes the site of the evolutionary area and the ground now naturally occupied by the predominant *Lumbricidæ*.

The Lumbricidæ are, according to Mr. Beddard, the most highly endowed and latest evolved earthworms in the world, and absolutely predominant over all others; they are characteristic of the Palæarctic region, and especially of Europe, and exactly correspond in range and dominancy with the Siphonadeniate mollusca and are probably following the same migratory paths. The Lumbricids have also a marvellous capacity for migration and for adaptation to new circumstances, establishing themselves everywhere with remarkable celerity, and quickly driving off the native worms: in fact, in New Zealand, South America, and other archaic lands, it is now almost impossible to procure native worms near the settlements, the Lumbricids having taken full possession of the ground.

The Megascolecidæ, judged by their geographical distribution, stand next the Lumbricids in order of evolution and dominancy, and occupy Eastern Asia, their range extending from Japan and China to the Malay Archipelago and Australasia; areas in general correspondence with those of the Enadeniate and Epiphallogonous Helices, which possess exactly analogous dominating power.

The species of this group, and especially its rearmost and latest evolved genus *Pheretima*, have great powers of dispersal and colonization everywhere, except in the regions dominated by the *Lumbricidæ*.

The remarkable correlation of the distribution of the Megascolecids with the Enadeniate and Epiphallogonous Helices in the Old World is also shown in America, where representative species occupy precisely similar geographical positions along the shores of the Pacific Ocean, and have identically the same dominating power, being the highest earthworms in that region.

The Geoscolecidæ are, from their geographical position, evidently of more ancient origin than the two preceding groups, and that they constitute a more archaic type is shown by the general absence of dorsal pores: such absence being an attribute of aquatic life, and a characteristic of their aquatic ancestors.

This group is quite analogous to the molluscan group *Epiphallogona*, having the same degree of dominancy over species and groups of more ancient origin, and being regressive before the more recently evolved and modern *Megascolecidæ* and *Lumbricidæ*, exactly like their molluscan analogues, and inhabiting corresponding regions, being found in South Africa and Madagascar.

In the New World this group has followed the same path as described for the mollusca, and is now found in South America and the West Indian Islands, in positions exactly corresponding to those of the analogous or representative molluscan groups.

The Acanthodrilidæ, which are analogous to the most primitive group of *Helices*, the *Protogona*, and are the simplest and most archaic of their kind, as is shown by the absence of dorsal pores and their partially aquatic habits; they also originally arose in the European region, and in their time were the dominant race of earthworms, but have been gradually driven from country to country, until at the present day they are restricted, with other feeble forms of life, to the most remote regions of the world, or those most difficult of access by natural means from Western Palæarctica.

In addition to the southern extremities of continental lands where the Acanthodrilids are still dominant, they are the prevailing native type of worms in the Eastern United States, being represented by *Microscolex*, *Diplocardiinæ* and *Ocnerodrilinæ* all of which groups are closely allied to *Notiodrilus* the most primitive earthworm known, and standing nearest the assumed generalized form from which the earthworms arose; this again confirming the unity of plan governing life distribution.

In the **Mammalia**, although the destruction or retreat to less civilized regions of those animals useful to man or deleterious to his interests has interfered so largely with their geographical distribution, yet exactly the same principles prevail as in other life groups.

The *Prototheria* stand at the very base of the mammalian series, and approximate in their structure and physiology to reptilian life standing between the typical warm-blooded homæothermic life and the cold-blooded poikilothermic reptiles. This group includes the *Ornithorhynchus* and the *Echidnidæ*, the former confined to Australia and Tasmania, and the latter ranging as far as New Guinea, regions where all the most primitive life of the world is to a large extent now congregated and restricted.

The *Eutheria*, of which the Marsupials are the most primitive representatives, lived in Europe in Mesozoic times and lingered there until the tertiary period, but their metropolis is now in Australia where they are the dominant mammals or were until the artificial introduction of the stronger and more modern forms; representative species or genera also still survive in primitive South America and Eastern North America, but all are dwindling to extinction.

The Wild Horse (*Equus caballus przevalskii* and *celticus*), though now restricted in the wild state to the deserts of Central Asia is probably the main ancestral stock of the ordinary domestic horses of North-west Europe, from which it differs in the shape of the skull, and the presence of distinct callosities on the fore legs only.

In their geographical distribution they harmonize with the general laws and though now expelled in the truly feral state from Europe, they still survive in a wild and semi-wild state or in captivity on its outer fringe or in the immediately adjacent countries.

In Iceland, the Faroes, the Shetlands, the Hebrides, the West of Ireland, the West of Norway and no doubt in other places, more or less closely related forms are found. It is also reported from North Africa, and is found in the wild state in the Gobi desert of Central Asia and quite recently inhabited the Kirghiz Steppes of Tartary.

It also exists in a somewhat modified but domesticated state in Alsace, probably descended from the wild horses of the Swiss lake-dwellings period at which time they would probably be widely diffused over Europe, as the pre-historic sketches found in the Madelaine Cave, Dordogne, France, and the fossil skulls from the superficial deposits of Essex, show an animal quite similar to the present day Mongolian wild Horse.

In **Ornithology** we have an exemplification of the same principles or laws as in other groups, and perhaps the first generally accepted division of the earth into geographical regions was that devised by Dr. Sclater for the Passerine birds, which regions are still very generally accepted as most expressive of the distribution of life.

Prof. Alfred Newton, the greatest scientific ornithologist of his day, was, apparently, quite in accord with the principles here

advocated, for in speaking of Western Palearctica or Europe, he declared that it possessed the most highly developed bird-fauna in the world, and one from which the weakest types had been generally eliminated, and that all the families of birds found therein consisted of stronger forms than those inhabiting other countries, so that the faculty of extending their range, and occupying other regions, was possessed in a greater degree than by the birds of any other country.

He also regarded the Asiatic and North American birds, and the still more archaic and morphologically low species of South America and Australia, as of inferior dominating power, and accepts the route from Europe through Asia as the route of travel to the Malayan islands.

The known distribution over the world of many families and genera of birds is entirely confirmatory of the location in Europe of the region of greatest evolutionary progress, and also of the correctness of the view as to the routes by which such distribution has been attained, while in accord with all other groups, the most primitive and archaic of existing or recently extinct birds, the Apteryx, the Dinornis, the Æpyornis, the Rhea, the Dodo, etc., were, or are now, restricted to the most isolated and distant oceanic islands or to the same remote and primitive countries in which all other ancient forms of life are now chiefly congregated; while geologically we have evidences of the correctness of these assumptions, as in the Miocene deposits of Europe are found undeniable traces of the former occurrence of the Trogons, Jungle-fowl and other birds now characteristic of tropical Asia, along with Parrots, Plantain-eaters, etc., allied to forms now living in West Africa and elsewhere.

The distribution of the true Jays (*Garrulus*), which has been worked out in detail, conforms entirely to the migratory routes already described, the European Jay being the latest evolved and the most dominant species: while those races which are now remote from their place of origin are of greater antiquity and more primitive organization.

The Marsh Tit furnishes in its distribution from Europe through Asia precisely the same evidence as to the route by which its dispersal has been effected, and much other similar and corroborative evidence could be adduced.

The Carrion and Hooded Crows, whether distinct species or merely races, show by their distribution how one race is slowly displacing another, and gradually expelling it from the European area, so that in Central Europe the weaker race has been compelled to take refuge in the mountains, and generally is being gradually squeezed into the outlying countries of Europe.

Further evidence has been afforded of the greater activity of the evolutionary power in the North-Central European region, beyond that of adjacent countries, by the precise and accurate methods of investigation and comparison, now happily becoming more in vogue

by the most advanced scientific workers, which show that certain birds have acquired a more advanced plumage there than elsewhere, and this advancement is proportionally less as we recede from the most active area, and as all the teachings of morphology demonstrate that characteristics peculiar to the immature or juvenile stage of life, which become outgrown or lost at maturity, are those their more primitive ancestors bore when fully adult, and that in proportion as these peculiarities of youth are outgrown is superiority over their predecessors proclaimed.

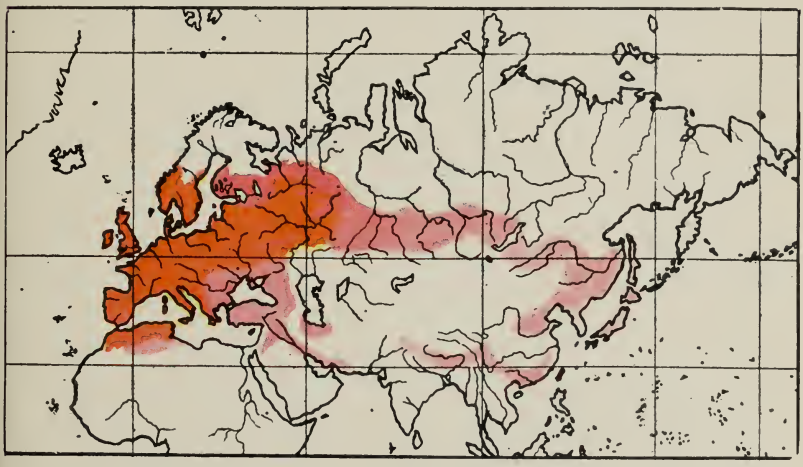

FIG. 8.—Geographical distribution of the true Jays (*Garrulus*) showing their Euro-Asiatic range and the striking coincidence of their paths of dispersal with those of other organisms (after Dr. A. Russel Wallace). The inhabited regions are shown in RED and the relative degrees of dominance of the various races indicated by paler shades of colouring.

The Coal Tit, in most parts of Britain, and still more strikingly in Germany, has, according to Mr. Ogilvie Grant, attained a plumage beyond that in which the fully-grown birds in certain parts of Ireland and North Africa are still clothed, the North African birds representing a more primitive or youthful stage than the Irish race, which have advanced a step beyond; this adult feathering of the African and Irish birds being that of the juvenile or nestling stage of the British and German race, shows that the African and Irish birds retain in mature life the plumage that the British and German birds have progressed beyond.

Amongst other genera, according to Dr. Hartert, showing this evolutionary advance are the shrikes, some of the more primitive forms of which group, as *Lanius excubitor mollis* Eversm., which breeds in the northernmost parts of Eastern Siberia, from Kamtschatka to the Lower Yenissei river and *Lanius excubitor borealis* Vieill., inhabiting North America, both retain in adult life the *wavy barred breasts*, which in the European form is a feature of the nestling or juvenile plumage only, and is lost in adult life; while

the *Lanius tigrinus* Drap., which ranges in the breeding season from the Ussuri river and Corea to North China and Japan, retains throughout life the *bars on the back*, an ancestral character which is still visible in all young shrikes, but disappears on moulting in the more dominant species.

That interesting bird, Pallas Sand Grouse (*Syrrhaptes paradoxus*), presents an interesting case, illustrative of the periodic irruption of a weaker race into a stronger area, and recalling the migrations of the Lemmings; but without very efficient and constant protection we can scarcely hope that it will ever be able to effect a permanent settlement in this country.

The **Arthropoda** or Insecta generally, have not yet in any department been so thoroughly studied as to evolve a system of classification showing a truly phylogenetic scheme and one from which their geographical distribution could be deduced.

In Coleoptera, although Dr. David Sharp in referring to the relative status of the coleopterous fauna of Europe and other countries assents to the probability of a greater proportion of the more primitive groups being present in Australasia than in Palæarctica, little further progress has been made except in regard to the British Isles, for which area Mr. W. E. Sharp, an accomplished coleopterist, has with infinite trouble described and cartographically demonstrated the orderly distribution of its coleopterous fauna, and shown it to be in strict conformity to the laws I have enunciated as governing the dispersion of all organic life and quite in accord with that of mollusks, spiders, diatoms, plants, birds and even mankind.

Mr. Sharp for his purpose, first separates those species universally dispersed over these islands, citing as examples *Nebria brevicollis*, *Ocypus olens*, *Pterostichus madidus*, and *Otiorhynchus picipes*; he also separates those species which are only found under artificial conditions, and divides the remaining species into two groups which distinguishes as Adaptables and Unadaptables.

The Adaptables or Dominants, which he terms "Teutonic," are derived from Central Europe and in this country have their metropolis in the South-east of England, extending more or less over the whole country, but thinning out to the north and west: they are the aggressive group and are gradually displacing the earlier species: they are typified by *Carabus monilis*, *Agabus abbreviatus*, *Nebria livida*, and *Odacantha melanura*.

The Unadaptables or Regressives include the remaining species and I have Mr. Sharp's assent to my terming the three groups, into which he divides them, retreating or decadent, and all of them exhibit a restricted and discontinuous distribution; one doubtfully distinct group represented by *Cicindela germanica*, *Bledius occidentalis*, and *Buthaxia nitidula* being restricted to Southern or South-eastern England; another section, the "Celtic" or Northern group, is chiefly confined to Scotland and the West of Ireland, being elsewhere

found only on mountains and on moorlands; it is in Mr. Sharp's view the most ancient element in our coleopterous fauna and represented by *Carabus clathratus*, *Nebria gyllenhalli*, *Elaphrus lapponicus*, and *Dyticus lapponicus*. The third or "Atlantic" group

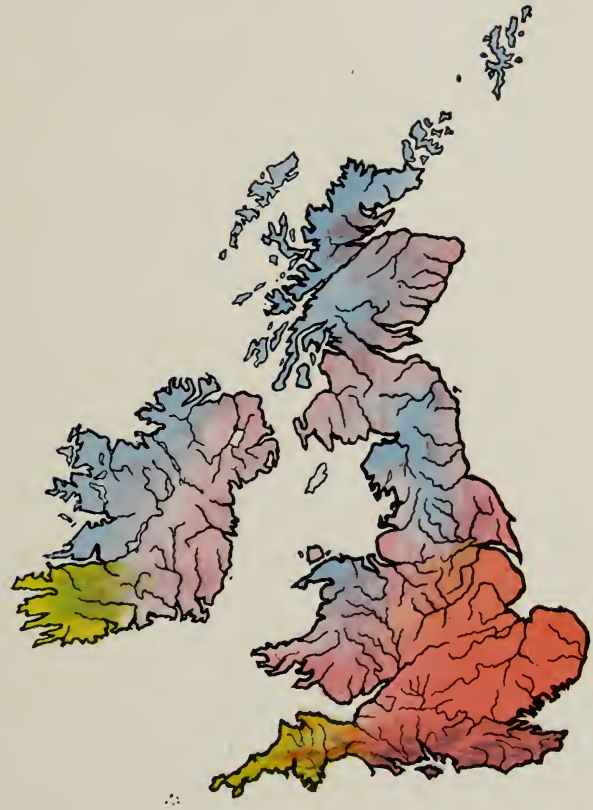

Fig. 9.—Geographical distribution of *Coleoptera* in the British Isles, illustrating exactly the same principles of dispersal as those governing other forms of life, as the predominance of the later evolved species of North-Central Europe and the relative inferiority of those species of more ancient origin (after Mr. W. E. Sharp).

The Red represents the area of the dominant North-Central European species which have overspread the country and are gradually dispossessing the previous inhabitants, of which Blue represents the weaker "Northern or Celtic" element, now restricted to mountains, moors, and other inhospitable places, while Yellow indicates the places where species of the so-called "Lusitanian or Atlantic" group still linger, and Brown shows the isolated or discontinuous range of the feeble and regressive "Southern" species.

typified by *Nebria complanata*, *Rhopalomesites tardyi*, *Exomias pyrenæus*, and *Micropeplus cœlatus* is a small assemblage of species confined to Ireland and the extreme South-west of England and suggested to be probably derived from a now sunken Atlantic land.

These three groups Mr. Sharp, following Prof. Forbes, derives from Arctic and other areas, but as I have already shown the improbability of invasion from these weaker and hypothetical sources, and the distribution of the groups being quite in harmony with that of other forms of life, I am compelled to regard each of these groups as representing successive waves of life from North-Central Europe, the active evolutionary area from which Mr. Sharp himself derives the latest and most dominant invaders.

In LEPIDOPTERA, although the relationship of phylogeny and distribution have not yet been investigated, yet from the available data, we are able to arrive at the same general conclusions as demonstrated by other forms of life, as *Palæomicra*, the most archaic Lepidopteron known, is found only in New Zealand, the most primitive region of the earth, while the most dominant genera are those of the northern hemisphere : the precise accord of these acknowledged facts with those furnished by all well-studied groups gives us authority to expect a similar concordance in the details when investigated.

The erudition and immense labour involved in the elaboration of the masterly scheme of classification formulated by Mr. Meyrick and based on wing neuration will not have yielded its full fruits until the phylogenetic dispersal of life has been elucidated, but from evidence available it is seen that the life of the Palæarctic region is of the most advanced type and the most dominant in the world, and that New Zealand, perhaps the weakest and most primitive region on the globe, also harbours *Palæomicra*, which stands at the very base of the Lepidopterous series, in close affinity to the *Trichoptera*, and close to the point of divergence of the two groups, while Patagonia, which contains the most lowly and primitive life has a Lepidopterous fauna quite in accord, as Mr. Meyrick affirms it to have much affinity with that of New Zealand.

Mr. Dadd, of Berlin, furnishes evidence of the power of North Central Europe to initiate specific difference, affirming on the authority of Dr. Dietze that what are known as the differential characters of *Eupithecia succenturiata* and *E. subfulvata* are in Germany only known in the initiatory stage, but in England according to Mr. Prout these differences have acquired distinctly specific value.

The genus *Vanessa* is especially characteristic of the Northern Hemisphere and in the opinion of Dr. D. Sharp its members are the most dominant and advanced butterflies in the world, capable of prospering under the most varied and adverse conditions, and this view is not impugned but supported by Mr. Meyrick's morphological arrangement of the group. The *Libytheides* are a generalized and ancient group of Vanessoid appearance but exhibiting affinities and relationships to other groups, and are found in most warm and temperate continental regions as well as in the Mauritius and Antilles, and they are apparently the stem from which *Vanessa* and other groups may have been evolved.

The *Pierida* though in its widest sense dispersed over almost all the known world would appear to embrace some of the most modern and dominant groups and its careful and analytical study should help to elucidate many points of phylogenetic and distributional interest.

The genus *Erebia* is apparently undoubtedly regressive and is now characteristic of hilly and mountain regions in this country and is being slowly driven northwards and westwards and to higher altitudes in the mountains, while it is a widely distributed group and extends almost over all the known world. The genus *Parnassius* is also a waning group and is now in Europe confined to the mountains, its present metropolis being now the Asiatic continent.

In ORTHOPTERA the meagre information available clearly points to the pre-eminence of the Central European species, the truth of the gradual migration of faunas and the accuracy of the eastern route of retreat of those weaker forms compelled by stress of competition to migrate therefrom.

Dr. Malcolm Burr has recorded the existence in Moravia of an isolated aggregation of ancient species of *Orthoptera*, with little or no affinity to the species inhabiting the surrounding country, and of which about eighty species were collected within a very limited area of poor and desolate land: their refuge being surrounded on all sides by the more modern and dominant species which had probably dispossessed them of the neighbouring favourable ground, and remarked that this detached and exiled colony of ancient species strikingly recalled the present day Orthopterous fauna of the valley of the Volga and were probably the last relics of a former Central European fauna which has become dispossessed by more modern and later evolved species.

In **Botanical** science, although a connected scheme of the distribution of life in connection with phylogeny and evolution has yet to be devised, yet the same principles undoubtedly govern the distribution of plants, as have been already demonstrated to exist in animal life.

Ecology, the new phase of botanical study, recognizes dominancy and the resulting expulsion of the more primitive and archaic species from certain regions or localities, as powerful factors in geographical distribution, for as Darwin has shown, the modified and improved descendants will tend to drive off or extirpate the more primitive parent forms, and usurp the places they occupied.

The Vegetation of Europe, but especially North Central Europe, according to the famous botanists, Dr. Schimper and Prof. Warming, is of precisely the same highly organized and dominant character as that for which the various branches of the fauna are so pre-eminent. It is mainly what is termed Mesophytic by Warming, or Tropophytic by Schimper, and its constituent species are very plastic, or

adaptable with great powers of accommodation to a variety of circumstances, in fact, their powers of accommodation or adaptability exceed those of all other plants ; they are dominant over the world, and are present in every latitude of the globe and, moreover, it is the only flora that is so, so that it is only by fortuitous circumstances that the weaker and more primitive vegetation of other regions can obtain a precarious and temporary lodgment within the region ; such lodgments being most frequently observed in aquatic species, which, owing to the constant dredgings of our canals and waterways, obtain footholds in the new soil which is from time to time exposed.

Although untold millions of seeds and spores of plants are annually produced, yet that few survive, is shewn by the relative numbers of the different species only slightly fluctuating from year to year, so that a number equivalent to practically the whole of the new generation is regularly destroyed—and this equally applies to animal life—

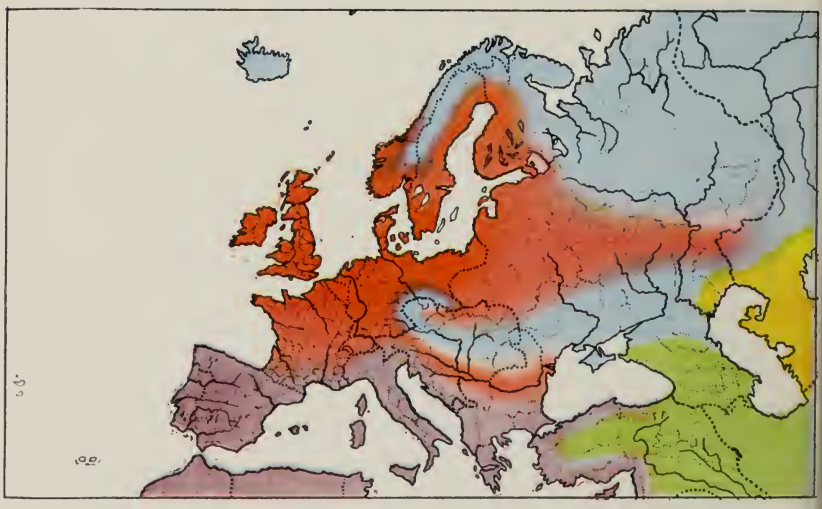

FIG. 10.—Floristic map of Europe showing the identity in distribution of the Flowering Plants with that of animal life, the same region evolving the dominant or most highly advanced Floral life and pursuing precisely the same migratory route from Europe (after Prof. Drude).

The RED indicates the regions occupied by the predominant or Central European group and shows also the practical identity of their line of advance into Asia with that of animal life. The BLUE represents Drude's West Siberian flora, which in Central Europe is being driven into the mountains, and is also shown to be in process of being cleft into a Northern and Southern group by the advance eastward of the more dominant races which have succeeded them. PURPLE denotes the flora known as Mediterranean or South European. YELLOW indicates the flora of the steppes or of Turkestan, and GREEN denotes an earlier form of the Mediterranean type which overspreads Asia Minor, etc.

so that the natural extension of the range of any species within its native region is very slow, so slow indeed that it has been computed by Fliche that the Beech occupies 25,000 years to spread 250 miles, while the Scots Pine needs 50,000 years to spread the same distance, the enormous length of time consumed being probably due to the very slight differences in dominating power of the competing trees, so that

the struggle for supremacy resulting in the expulsion of a species from any region is very keen and necessarily very prolonged.

But if dominant European plants be naturally or artificially placed upon unoccupied or virgin land or in some weak and primitive region where the native organisms are comparatively low in the scale of life and the difference of dominancy therefore great, so that the competition they encounter is less effective and deadly, the stronger species rapidly multiply and speedily over-run the country of which they take almost complete possession, quickly expelling the native organisms. In this way the thistles of various kinds have over-run immense tracts of land in South America, and now form dense and lofty thickets; while in the United States, New Zealand and other weak countries the European weeds are rapidly dominating and driving off or destroying the native vegetation.

The actuality of this struggle and its inevitable results are well shown by a neglected garden, where the rapid growth of weeds speedily results in the crowding out and destruction of the cultivated plants, many of which can perfectly well endure our climate, but cannot compete with our native plants, and, therefore, cannot become naturalized, for it cannot be too strongly emphasized that the struggle with other plants, etc., is far more important than the influence of soil or climate in determining distribution.

The effects of the struggle for the possession of the most desirable ground is seen by the fact that modern groups tend to monopolize them, while the most primitive species are found to have sought refuge within the dim recesses of extensive forests, in arid or desert regions, or in marshy tracts and other unfavourable stations, where the species driven to such shelters have undergone the changes necessitated by the modes of life they have by stress of circumstances been compelled to adopt.

The dominating tendency is shown by the aggregation and formation of great forests or extensive tracts of more or less specific uniformity, a feature characteristic of distinctly dominant forms of life, not only in plants, but in all other departments of Nature, and one unfailing indication of decreasing dominating power is found in the increasing diversity of the woodland trees, and other forms of life as we proceed eastward from the European region.

The distribution of the Edelweiss (*Leontopodium alpinum*) also clearly displays the greater severity of the competitive struggle in Europe as there that species is now quite restricted to the mountain regions, while in Asia, where the flora is more primitive and the competition less severe, it is a common lowland meadow flower.

The richness and diversity of specific life in any region or district is one of the most striking evidences of the weakness of its organic life, for such regions form a refuge or sanctuary for those numerous forms of life that have been worsted in their contest for superiority with the stronger species.

The tropical rain-forest is especially remarkable for the rich variety of its generic and specific life, but this miscellaneous aggregation of tropical vegetation is essentially regressive and weak, its component species being believed to have formerly enjoyed a more extended distribution than that to which they are now restricted: the rain-forest really constituting a sanctuary or refuge for weaker organisms of varied origin and sharply contrasting with the social methods of growth which gives such noticeable uniformity to the European forests.

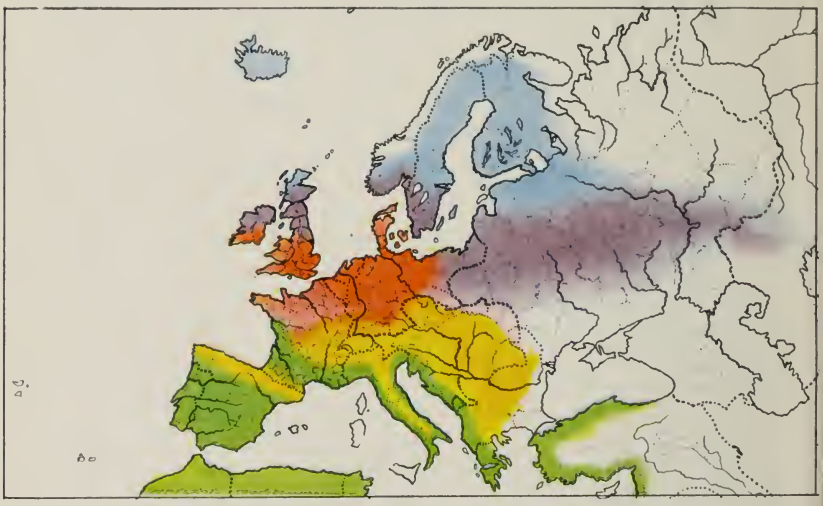

FIG. 11.—Geographical distribution of Forest Trees in Europe showing the occupation of the probable evolutionary region by the Beech, the most dominant and recently evolved tree and the expulsion therefrom of the Oak whose range has been made somewhat discontinuous by the uprising of the Beech and also showing the same chief path of migration from Europe as followed by other organisms (after Berghaus).

The RED shows the region wherein the Beech has arisen and is now dominant; the PURPLE represents the regions in which the Oak is still supreme, and wherein the Beech has not yet spread or where it does not yet thrive so well; the GREEN colour indicates the countries or districts characterized by the Evergreen Oak; the YELLOW denotes the mountain regions of Central Europe which are dominated by the Silver Fir; the BLUE shows the districts or countries where the Birch and Scots Pine are still the characteristic trees, though being slowly driven further and further from the evolutionary area.

Amongst trees the BEECH (*Fagus sylvatica*) is the most recently developed and dominant species in the world, and although there are numerous other species of *Fagus* dispersed over the earth, yet these are of earlier origin, and confessedly inferior in dominating power to the latest evolved European species. In the British Isles it is, geologically speaking, a recent immigrant from the continent, and is driving off the oak, the ash, and other trees, and monopolizing the more favorable positions and soils previously occupied by these species, as the beech can thrive beneath the shadow of any other tree, while none can prosper beneath the denser shade of the beech.

That it is recently evolved and extending its range is confirmed by the fact that although Denmark was overspread by beech forests

even in Roman times, yet its relics are not found lower than beneath the upper strata of the peat bogs, and are there associated with iron implements and weapons.

The Pedunculated Oak (*Quercus pedunculata=robur*) is probably next the Beech in dominating power and formerly extended over and occupied the whole of the clays and loamy soils of this country, and still forms extensive forests beyond the effective range of the beech or on soils upon which the beech does not yet thrive so well. Though growing freely on deep, damp sands and on marls or calcareous clays, it is more especially characteristic of the deep and moist heavy or medium soils of the lowlands and does not naturally ascend the hills higher than about 600 feet, its place above that height being assumed by its close ally and predecessor *Q. sessiliflora*.

The earlier evolution of the Pedunculated Oak, compared with that of the beech, is not only shown by its geographical distribution being more extensive and less continuous, but by its remains in the peat-bogs of Denmark, being always found at a lower level and in association with weapons and implements of the "Bronze" age.

The Sessile Oak (*Q. sessiliflora*) is the predecessor of the Pedunculate form and being an earlier race is comparatively regressive, has a greater geographical range and ascends the hills to a greater altitude. It is, however, still the dominant oak on shallow soils of a dry and siliceous or non-calcareous character, or at altitudes below 1,000 feet, ranging downwards to 600 feet, where it is superseded by the more dominant *Q. robur*.

Its prior evolution to the Pedunculated Oak is confirmed by the occurrence of its remains in the Danish peat-bogs, where the relics of the Sessile Oak are found beneath those of the Pedunculate form, their relative antiquity is also demonstrated by the weapons and implements of the "Bronze" age which are characteristic of and distributed throughout the deposits containing *Q. robur* being only found in the upper part of the deposit containing the remains of the Sessile variety, while the lower part is characterized by weapons and tools of Neolithic age.

The Scots Pine (*Pinus sylvestris*) is a very ancient and therefore regressive tree, growing on very diverse soils and in very exposed and unfavourable situations: it is, however, dominant over the birch, which is a still earlier evolved and more primitive tree. The Scots Pine, though formerly so abundant throughout Britain, as evidenced by the immense number of its cones imbedded at the base of the peat-bogs and in "submerged forests" of the Neolithic period, has since been expelled from the more favourable southern districts and gradually driven northwards and into the mountain districts by the oaks and other more dominant trees. In Scotland, however, it is still the dominant tree in the more northern regions.

In Denmark, it also formerly overspread the country and its remains mixed with those of the birch and other trees are found beneath

the deposits characterized by the Sessile Oak, and are intermingled with polished flint tools and weapons of Neolithic age.

The **Fungi**, although their geographical distribution is far from being fully known, yet Mr. Geo. Massee, one of our leading mycologists, has shown that sufficient data have been accumulated to demonstrate clearly that fungi are subject to precisely the same distributional laws as those governing other forms of life, and he has been able to trace out the probable phylogenetic sequence of the evolution of certain of the groups from their algal progenitors, a chronological arrangement supported by, and in harmony with, their known geological succession in the rocks, for Zeiller has recorded the existence, in fossilized vegetable tissues of Lower Carboniferous and Permian age, of *Chytrideæ*, *Mucoraceæ*, and *Peronosporeæ*, all of which belong to the *Phycomycetes*, the most archaic and primitive of existing fungi; while numerous well-preserved relics of *Ascomycetes*, *Pyrenomycetes*, *Discomycetes* and *Hyphomycetes* have been found on the fossilized leaves and within the tissues and stems of many different plants in various strata from the Carboniferous period upwards; while the *Basidiomycetes*, represented by species referred to *Agaricineæ* and *Polyporeæ*, are present in the Tertiary formation.

Geographically the same relations of the dominant groups with those of more archaic character are maintained exactly as in other forms of life. In the European region the higher and more recently evolved groups are predominant, while in tropical and sub-tropical countries, although representatives of all groups may be present, yet the older and more primitive families, *Polyporeæ* and *Thelephoraceæ*, are more especially characteristic of those regions: and in the Arctic countries, with their unfavourable conditions of development, the more primitive parasitic fungi chiefly referable to *Deuteromycetes* are in the ascendant.

At the present day fungi are not indiscriminately scattered over the land, for the uplands, the lowlands, the marshes, the forests, the moors, and the mountains, each have their peculiar species which are restricted to them, and are not found under any of the other variously diverse conditions. The fungus-flora of a pine wood usually consists mainly of the more primitive and lowly organized species bearing dark or coloured spores; while in the forests of oak and other broad-leaved deciduous trees, the later evolved and more highly organized kinds with minute white spores, are predominant, and are thus in accord with the more modern and advanced type of woodland they inhabit.

The Agarics, which belong to the *Basidiomycetes*, are the most dominant group. They are also the best known, and, perhaps, the most characteristic fungi of this country, and its members can be arranged into five groups, varying in the degree of pigmentation and the size of the spores, which characters also express their phylogenetic sequence.

The Black-spored species are the earliest evolved and the most primitive group, the spores being of a large size, and endowed with a certain amount of hereditary motility favourable for their dissemination by water, and reminiscent of their algal ancestry. The bulk of these dark, macrosporous species show a weak development or absence of alkaline, poisonous or corroding substances in their cell contents, and they are, therefore, generally edible.

The Brown and Purple-spored species blend with the nigrosporous forms, over which they are dominant: their spores are smaller and they also possess more generally the protective or defensive secretions of poisonous or caustic alkaloids.

The Pink-spored species are a still later evolution, and are also more richly endowed with defensive noxious secretions. The spores have also dwindled in size still further, and the dominancy over the dark-spored and earlier evolved species is more effective and striking.

The White-spored species display the highest development attained by the Agarics, the spores being increased in number and reduced to the most minute size, capable of being borne away and disseminated by the lightest wind, while the protection obtained by the secretion of obnoxious or injurious substances is still further increased, and sometimes to such a degree that certain species are deadly in their effects if used for food.

This highly organized group is absolutely predominant over every other section, the mycelium apparently more readily abstracting all suitable nourishment from the ground, or otherwise giving off secretions which are detrimental to the growth of the more primitive or less highly endowed species.

The pink, the brown, the purple, and the black-spored species are in relation to the white-spored species in an increasing degree regressive or decadent, and are gradually being driven off by the competition of their more dominant competitor further and further away from their probable or assumed evolutionary area, and are becoming scarcer and scarcer in regions where it may be assumed that ages ago they were more plentiful.

This process of expulsion or extermination is displayed by the observed struggles for the occupation of some favourable spot; the white-spored species or their closest allies invariably and quickly overcoming those bearing pigmented spores, for it has been actually demonstrated that the white-spored *Clitocybe* or the pink-spored *Volvaria* invariably destroy the mushroom-beds upon which the purple-spored edible mushroom is cultivated on obtaining access thereto; while the more primitive black-spored *Coprinus*, which is normally abundant upon the substances of which a mushroom-bed is composed, and would have been expected to be its chief enemy, is quite unable to establish or maintain itself under such circumstances, and justifies the law, that in this, as in all other forms of life, the power of monopolizing a given area is more dependent on the relative dominancy of competing species, than on physical conditions.

The **Diatomaceæ** and **Desmidiaceæ** in their geographical distribution are also perfectly in harmony with all other groups and strikingly display the results of the dominancy of Diatomic life and the regressive and feebler character of the Desmids in the relative position they occupy, for, according to Prof. G. S. West, it is established that the pools, lakes, and ponds situate upon the more lowland parts of the country, and rich in dissolved mineral salts derived from the newer and softer Tertiary strata, are almost completely monopolized by *Diatomaceæ*, while the *Desmidiaceæ* are quite scarce or absent.

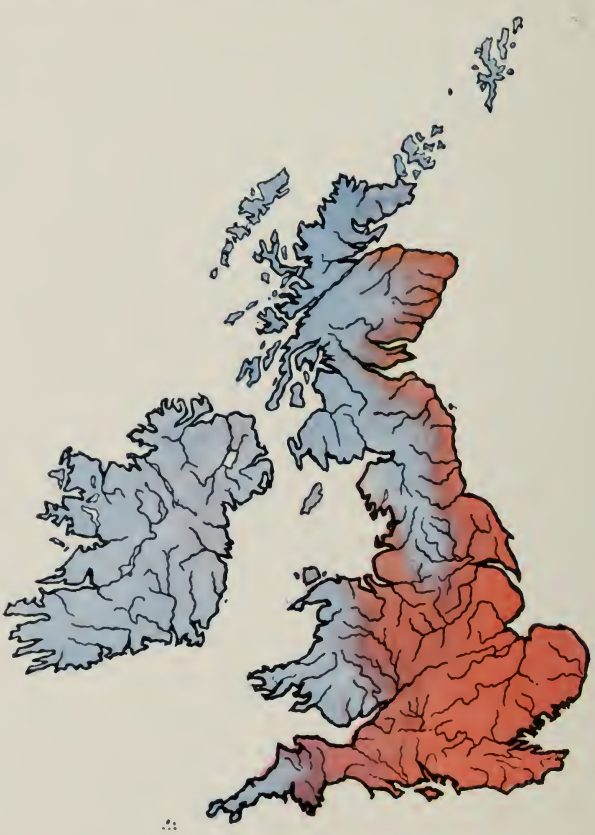

Fig. 12.—Map illustrating the geographical distribution of Diatoms and Desmids in the British Isles, and showing its essential similarity to that of the coleoptera and other forms of life. The Red represents the areas dominated by Diatomaceous life and Blue that in which the more regressive and weaker Desmidiaceæ are still pre-eminent.

On the contrary, the areas richest in Desmidian life correspond geographically with the outcrop of rocks of Palæozoic or Precambrian age in the mountainous regions of England, Wales, Scotland, and Ireland, where the waters of the lochs and pools are very pure and clear, and almost deficient of dissolved mineral salts. In such

localities *Desmidiaceæ* are the dominant forms of Planktonic life, and Diatoms are only represented by a few species, which are probably those least able to withstand the competition of their congeners, occupying the richer food waters of the lowlands.

The MYXOPHYCEÆ or blue-green algæ are also apparently very regressive and weak forms of life, being almost restricted in this country to very stagnant or foul waters, with deficient aëration and abundance of decaying organic matter, such waters being always characterized by a wealth of the very lowest forms of vegetation: the Myxophyceæ are, however, more plentiful in the loughs of Ireland where the competition is less severe.

It is **Mankind,** however, that affords evidence that probably appeals most forcibly to the ordinary individual and leads to agreement, or otherwise, with the principles involved by acceptance of Evolution, Dominancy, and the struggle for existence, for man is equally subject, in common with all life, to his environment, which powerfully affects his mental and physical characteristics, and leads to the formation of racial or national peculiarities.

In studying mankind we find a very full confirmation of the truth of the laws here set forth: there is exactly the same area of chief evolutionary activity and dominancy; the same natural routes of dispersal, with the same distribution of the weaker and stronger races over the globe, with a connected series of gradations leading from the most primitive and barbarous tribes to the most recently evolved races of the highest intellectual and vital energy, exactly analogous to that seen in all other forms of life, with the same expansion of the highly endowed races, and the same expulsion or destruction of the lowest or inferior races; so that the striking coincidence and harmony existing between the distribution and the comparative capacities or dominancy of mankind are exactly paralleled by the distribution and relative superiority of organization exhibited in the mollusca and other life groups, and inevitably lead to the conclusion that man and all other organisms are governed and controlled by the same principles, and that the same explanation of the same phenomena must apply to all.

The EUROPEAN or white race arose in North-Central Europe, the region where its distinguishing characters are chiefly developed. It is the latest evolved and the most intellectual, advanced, and dominant of all mankind, gifted with the highest mental capacity, and is the present culminating point of evolutionary activity.

Moreover, it is the only race which has spread, and is spreading far beyond the frontiers of its evolutionary region, and has seized immense tracts of land in all parts of the globe, expelling, or destined to eventually expel, the aboriginal inhabitants therefrom. The remarkable dominating and dispersive power of the race is such, that even before the dawn of Greek History, and probably myriads

of ages before, the races of North Central Europe made extensive and constantly repeated migrations and settlements in every direction from their native region : they passed into Italy and made early Rome, and also into Greece and elsewhere, greatly influencing the culture and character of the different peoples by conquest and occupation. Eastwardly, their migrations extended beyond the Caspian Sea, where they founded colonies and dominated the inhabitants. Westwardly, they overran and dominated France and Spain, and even countries beyond.

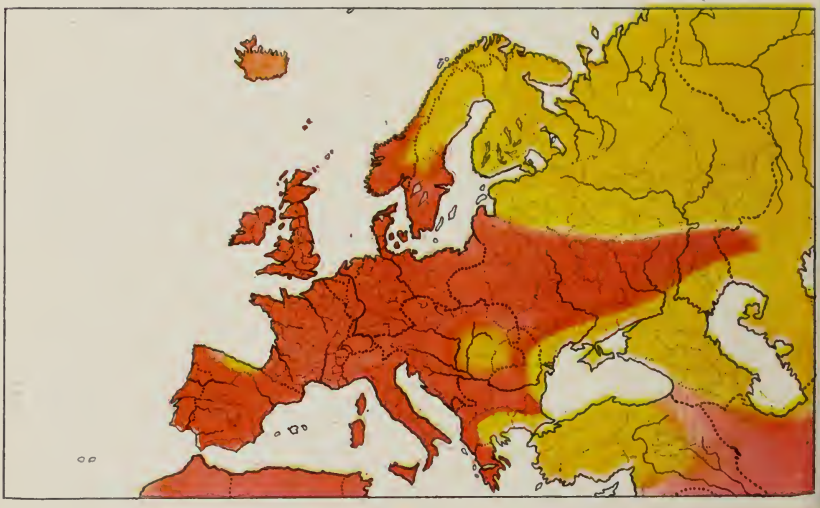

FIG. 13.—Map illustrating the areas occupied by the European and the Mongoloid races during the XVth century, showing the occupation of Eastern Europe by the Mongoloid stock and also the migratory path of the European races towards Asia which is identical with that of other organisms (slightly modified after E. Hæckel).

The RED shows the evolutionary area now occupied by the White races and their advance eastward by the same migratory routes as other species; the YELLOW indicates the regions inhabited by the Mongoloid peoples at that period.

The MONGOLIAN or yellow races, are next in order of dominancy, and in capacity and intelligence are only inferior to the European : they probably preceded the white race in the occupation of Europe, arising in the same region, from which they are being gradually expelled by their more highly endowed successors. The probability of their former presence is further shown by Mongolian traits being still perceptibly present in widely separated districts or countries of Europe, while according to Dr. Woods, of Harvard College, who has investigated this subject, the facial characters of Europeans were more distinctly Mongoloid three or four centuries ago.

The yellow races have now their metropolis in China or Eastern Asia, and are exactly equivalent to the Enadeniate Mollusca in their probable place of origin, their relative degree of dominancy and geographical range. Like their Molluscan analogues, the Enadeniates, they crossed to America and peopled much of the country. They

are also pressed from the West by the efflux of the higher forms from Europe, while they also in turn overwhelm or drive off their feebler neighbours in the South-east, etc., as in New Guinea, where they are gradually occupying the coast and driving the negroid aborigines to take refuge in the mountains of the interior.

The NEGROID or black races are the most archaic and primitive of existing peoples, and the lowest in their degree of mental endowment, while their muscular and bony structure has been shown by Dr. Frank Baker to be more primitive and anthropoid than that of other races.

These feeble peoples may be aptly compared with the *Protogona*, the most lowly group of *Helicidæ*, in their relative degree of inferiority, and in their isolation or enforced restriction at the present day to the most archaic and primitive regions of the earth and those the most remote and distant from the European area, or difficult of access therefrom by natural or primitive modes of locomotion.

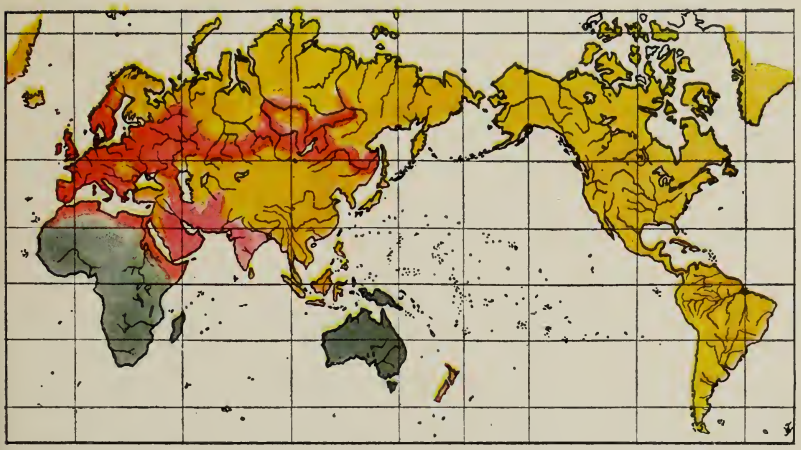

FIG. 14.—Map illustrating the relative positions in the world of the White, the Yellow and the Black races of mankind during the XIXth century, and showing the progress of the continued encroachments of the White race upon the territories formerly occupied by the Mongols in Europe from whence they are being gradually expelled, and later data show an accelerated rate of this expulsion, while the invasion of Asia by the White race is by the same route as that followed by all animals and plants (after Berghaus).

The GREY TINT denotes those countries *naturally* inhabited by the Negroid or Black races; the YELLOW the regions naturally dominated by the Yellow races; and the RED distinguishes the evolutionary area at present occupied by the White man, who is supreme and taking forcible possession of the larger part of the known world.

It should be borne in mind that this Map takes no account of the recent colonization of Australia, New Zealand, America, etc., rendered more practicable by the modern facilities for ocean transportation, and all of which are now practically Europeanized.

At some immeasurably remote period their ancestors probably inhabited the European region, and at that time would be the predominant race of the world, an era long before the evolution of the Tartar races, and of their still later successors the white men.

Many lines of study point to the former presence of these lowly and barbarous races in Europe, as Prof. Sollas considers the

aborigines of Australia as, perhaps, most nearly representing the most ancient race of hunters known in these regions.

These were succeeded by the hunters of Aurignac, distinguished by their love of Art, and which there are reasons for believing may still survive in the bushmen of South Africa; many representations of him and his characteristic steatopygy having been found in caves of Pleistocene age in the South of France, and the course of their retreat to their present refuge can be traced.

The Magdalenians were a still later race; they upheld the artistic traditions of their predecessors: they hunted and domesticated the reindeer in the plains of France, and devised a variety of implements and weapons for the chase, and were the ancestors of the Eskimo, who are now driven into Arctic wilds to eke out a precarious existence.

Every well-marked country or region is naturally characterized by a more or less distinctive race of mankind, whose peculiarities are evolved by isolation and the action of the environment, which profoundly affects, not only the external morphology, but also the mental character, and this moulding influence which is possessed, more or less, by every region, is shown by the gradual absorption and approximation to the national type of any invaders or immigrants domiciled there, as is stated to occur in Egypt, Greece, Ireland and other places, and as is actually seen in North America, where the descendants of European immigrants more or less quickly assume the physical aspect of the aboriginal Indians, to whose disposition, temperament, and cast of mind they will probably also eventually conform.

This approximation of immigrants to the native type in those countries to which the great tide of European emigration is turned, is held in temporary check or abeyance by the enormous influx of this higher and more vigorous life, but the cessation of this invigorating admixture of new blood will inevitably result in the acceleration of an increased resemblance to the native type and in some degree of deterioration or stagnation of the mental progress of the peoples inhabiting evolutionarily torpid countries as Australia, New Zealand, South Africa, South America, and North America, which, though often, but erroneously, regarded as the future world centres of highest culture and influence, are all countries of the weakest evolutionary power, and throughout innumerable ages have merely retained and modified without essential advancement the ancient types of life originally derived from Europe, but which have long been expelled therefrom by the more advanced life that has from time to time arisen there.

A further and final result of the action of this universally pervading Law of Dominancy and the struggle for existence will be the decay and extinction of the savage and barbarous races of mankind, and also the elimination of those of deficient or of the feeblest mental capacity, and this disappearance of the lowest mental types would be in no sense a calamity, but rather a much to be

desired consummation, for although there must of necessity always be relative degrees of vigour and capacity in the status of the peoples of the world subjected to differing environments, yet the general level of the mental and moral attributes of mankind will, undoubtedly, be gradually raised, and must result in the general uplifting and ennobling of the human race, the betterment of the whole world, and the evolution and dissemination of a higher type of mankind than the world has hitherto seen.

In concluding this survey of the subject of "Dominancy in Nature" it will be desirable to summarize the conclusions to which we are led by the evidence adduced or which can be adduced, and we may conclude:

That the principles of Dominancy in Nature with its accompanying and inseparable consequences, the occupation of the most favourable positions by the latest evolved and stronger forms and the subsequent expulsion and migration of the older and weaker species or their compulsory adoption of other modes of life may be accepted.

That these weaker or more primitive species or genera when thus expelled from their native regions, can never again return thereto, as the area becomes tenanted by the stronger and later developed forms that ejected them, so that to speak of a genus or species spreading from a primitive region into one of higher dominating power and after a lapse of centuries returning to its so-called original home, cannot be upheld and is a grave misapprehension of the laws of life; but this must not, however, be confused with the periodical or erratic irruptions of Lemmings, Sand Grouse or other species which, owing to an excessive increase in numbers, are compelled to seek food and space elsewhere, but which nevertheless cannot make permanent settlements within the more dominant countries where they are gradually or quickly destroyed. Such cases are paralleled in human history by such irruptions as those of the Huns, the Turks, and other races into Europe.

That the existence of an active evolutionary area, where the chief types of life have been evolved and improved races of animals and plants arise more quickly than elsewhere, has been shown to be highly probable by the convergent results of several lines of study, and that this region is under present conditions located in North-Central Europe, is shown by the pre-eminence of its life-forms and by the gradually diminishing dominance of the fauna and flora of the surrounding countries.

That all the most advanced and all advancing or progressive types of life are derived originally from this chief evolutionary area of North-Central Europe and that other countries cannot be shown to have evolved any or only few new types of life, but merely to have varied and amplified those derived from Europe without the initiation of any essential structural modifications.

That the routes by which the world has become inhabited have been by way of certain definable paths, which during recent geological ages have been delimited and influenced in their direction by the disposition of the great mountain ranges and other important physical features, and which are established as correctly expressing the true direction of the migratory movement by the concurrent testimony of many lines of investigation.

That the over-running of other regions by the more advanced and dominant life of Europe and the consequent destruction of their native organisms is established; while no plant or animal of other countries can effect a permanent footing and prosper within the European region, but is more or less speedily overcome by the more dominant and superior life by which it is surrounded.

That the known facts of geology harmonize with those of geographical distribution, is shown by the forms of life now living in or near the European region being only found fossilized in the most superficial deposits of the immediate vicinity, but organisms long extinct or now living in inaccessible spots or in regions remote from the evolutionary area are restricted to the older geological formations while Europe is the only region where this law can be strictly and entirely applicable, and

That man and all organized life, being equally subject to the operation of Natural laws, must be similarly affected by their action, and we cannot, therefore, hope or expect to see in the inhabitants of countries of feeble evolutionary power, progress and advancement in the future in any degree comparable with that of the peoples occupying the regions of greatest evolutionary activity.

APPENDIX.

The List of Members for 1912 and the Excursion Programmes 215 to 235 were edited by the late Secretary, Mr. T. Sheppard.

YORKSHIRE NATURALISTS' UNION.

LIST OF MEMBERS.

CORRECTED TO MARCH 1912.

The Members whose names are printed in heavy type are **Permanent Members of the General Committee.** The dates preceding names are those of election; Original Members, being those elected previous to 1883 are marked '—'; those to whom **L.** is prefixed are Life Members, by virtue of a donation of not less than seven guineas; and those to whom **H.L.** is prefixed are Honorary Life Members.

Members changing their addresses are requested to inform the Secretary as soon as possible. Those to whom an asterisk (*) is prefaced do not receive *The Naturalist.*

1905 .. Ackroyd, J., West View, Dark Lane, Batley.
1911 .. Allison, Fred, Mining Engineer, Guisborough.
1911 .. Amyot, Thos. E., M.B., B.Sc., 2 Hallfield Road, Bradford.
1896 **L.** **Anderson, Tempest,** M.D., D.Sc., 17 Stonegate, York.
1912 .. Anderson, Joseph, 17 Pemberton Drive, Bradford.
1909 .. Armstrong, A. L., 12 Dragon Avenue, Harrogate.
1910 .. Ascough, W., J.P., Grange Avenue, Scarborough.
1903 .. Arnott, Joseph, Bay House, Headingley, Leeds.
1894 .. **Ash,** Rev. **C. D.,** M.A., Saxton Vicarage, Tadcaster.
1895 .. Ashton, J. T., M.B., Kingthorpe House, Pickering.
1896* .. Ashton, Mrs. J. T., Kingthorpe House, Pickering.
1907 .. **Atkinson, J.,** 33 St. Michael's Road, Headingley, Leeds.
1911 .. Atkinson, Miss Constance, 3 Woodland Grove, Chapeltown Road, Leeds.
1897 .. **Audas, Thos.,** L.D.S., 46 Anlaby Road, Hull.
— .. J. Backhouse, Harrogate,
1911 .. Bagshaw, W., F.R.M.S., Moorfield House, Birkenshaw, near Bradford.
1895 .. **Bairstow, Uriah,** 48 Heath Crescent, Halifax.
1883***H.L.** **Baker, J. G.,** F.R.S., 3 Cumberland Road, Kew, Surrey (Ex-Pres.).
1896 .. Banks, Ernest, Cross Keys Inn, Adlingfleet, Goole.
1893 .. **Barker, R. H.,** Grosvenor Bank, Scarborough
1888 .. **Barnes, Richard,** Mayfield Grove, Franklin Road, Harrogate.
1897 .. Barraclough, William, Rothesay Villa, Victoria Street, Barnsley.
1908 .. Barry, J. W., J.P., Fyling Hall, Robin Hood's Bay.
1889 .. **Bayford, E. G.,** F.E.S., 2 Rockingham Street, Barnsley.
1893 .. Bean, Eugene, Hinderwell House, Falsgrave Road, Scarborough.
— .. **Bedford, J. E.,** F.G.S., Arncliffe, Shireoaks Road, Headingley, Leeds.
1907 .. Bellerby, W., 8 Burton-Stone Lane, York.
1884 .. **Bennett, S. H.,** Westholme, Rotherham.
1900 .. Benney, A. E., 9 Springcliffe, Manningham, Bradford.
1904 .. Bentinck, Rt. Hon. Lord, M.P., Underley Hall, Kirkby Lonsdale.
1907 .. Bevan, D. W., 32 Nansen Street, Scarborough.
1885 .. **Bingley, Godfrey,** Thorniehurst, Shaw Lane, Headingley, Leeds.
1903 .. Bisat, G. B., 30 Nether Hall Road, Doncaster.
1903 .. Blackburn, Rev. E. P., Epworth Villa, New Road, Windsor.
1909 .. Booth, G. A., M.B.O.U., 6 North Road, Preston.

1905 **L.** **Booth, H. B.,** M.B.O.U., Rhyhill, Ben Rhydding, Yorks.
—* .. **Bould, C. H.,** 29 Westbourne Road, Marske, Huddersfield.
— .. **Boyes, F.,** Beverley.
1894 .. Bradford Public Free Library, c/o Butler Wood, Librarian, Bradford
1904 .. Bradshaw, C., F.C.S., Museum, Weston Park, Sheffield.
1895 .. **Braithwaite, R.,** M.D., 26 Endymion Road, Brixton Hill, London, S.W. (Ex-President).
1885 .. **Branson, F. W.,** F.I.C., 13 Briggate, Leeds.
—* .. Brigg, Sir John, F.G.S., Kildwick Hall, Keighley.
1910 .. Brierley, J. H., 39 Maim Street, Sutton Mill, near Keighley.
1884 .. **Brittain, F.,** J.P., Melbourne Avenue, Sheffield.
1892 .. Brittain, W. H., J.P., Storth Oaks, Ranmoor, Sheffield.
1900 .. **Broadhead, C. H.,** Wooldale, Thongsbridge, Huddersfield.
1910 .. Brockman, Dr. Drake, Cleveland Asylum, Middlesbrough.
1885 .. Brooke, J. A., M.A., J.P., Fenay Hall, Huddersfield.
1911 .. Broomhead, R. H. B., The Octagon House, Beverley.
1903 .. Brown, Alderman J., Savile Street, Hull.
1907 .. Brown, J. A., Thornhill Street, Calverley, Leeds.
1904 **L.** **Brown, J. B.,** Stalheim, Hebden Bridge.
1911 .. Brown, James Meikle, B.Sc., F.L.S., 176 Carter Knowle Road, Sheffield.
— .. **Bunker, Thomas,** 9 East Parade, Goole.
1911 .. Burgess, Alfred, B.Sc., 136 Nottingham Street, Sheffield.
1910 .. Burnley, A., 43 Moorland Road, Scarborough.
1891 .. **Burton, J. J.,** F.G.S., Rosecroft, Nunthorpe, R.S.O., Yorkshire.
1907 .. Burtt. A. H., D.Sc., 4 South View, Holgate, York.
— .. **Butterell, J. D.,** The Manor House, Wansford, Hull.
— *.. Butterfield, J. E., B.Sc., Comrie, Eglinton Hill, Plumstead. London, E.C.
1909 .. Butterfield, Rosse, The Museum, Keighley.
1890 **L.** Carlisle, Rt. Hon. Earl of, Castle Howard, York.
1891 **L.** Carpenter, Hon. Mrs. B., Kiplin, Northallerton.
1903 .. **Carr,** Prof. **J. W.,** M.A., F.L.S., University College, Nottingham.
— .. **Carter, J. W.,** F.E.S., 15 Westfield Road, Manningham, Bradford.
1890 .. **Carter,** Rev. **W. Lower,** M.A., F.G.S., Bolbec, Bushey Grange Road, Watford.
1887 **H.L.** **Cash, William,** F.G.S., 26 Mayfield Terrace, Halifax.
1904 .. Castle, Thomas, Orchard Villa, Heckmondwike.
1905 .. Catterall, W. H., Rokeby School, Barnard Castle.
1891 **L.** Champney, J. E., J.P., 27 Hans Place, London, S.W.
1910 .. Chapman, E. H., M.A., 3 Harecourt Temple, London, E.C.
1910 .. Cheavin, H.S., F.R.M.S., Clematis House, Somerset Road, Huddersfield.
— **L.** **Cheesman, W. N.,** J.P., F.L.S., The Crescent, Selby.
1905 .. **Cheetham, C. A.,** Nutting Grove, Farnley, Leeds.
1898 .. **Chorley,** Mrs. **Mary,** F.E.S., Woodhead, Burley-in-Wharfedale.
— * **L.** **Clark, J. E.,** B.A., B.Sc., Asgarth, Riddlesdown Road, Purley, Surrey
1892 .. **Clarke, Alfred,** 9 St. Andrew's Road, Huddersfield.
— * .. Clarke, W. Eagle, F.L.S., 35 Braid Road, Edinburgh (Ex-Pres).
1892 **L.** Clarke, W. J., F.Z.S., 57 Oak Road, Scarborough.
1907 .. Clayton, John, Greendale, Leeds Road, Harrogate.
1894 .. Clayton, John, Lidgett Avenue, Wharncliffe Silkstone, Barnsley.
1906 .. Clough, Sam, Steeton Hall, near Keighley.
1903 .. Cole, T. S., Endcliffe Crescent. Sheffield.
1908 .. Collier, Rev. C. V., M.A., F.S.A., Langton Rectory, Malton.
1891* **L.** Cooke, J. S., J.P., F.R.A.S., Ploverfield, Ben Rhydding, Yorks.
1893 .. **Coombe, J. N.,** Abbeydale House, Beauchief, Sheffield.
1911 .. Cooper, Miss C. A., The Vicarage, Robin Hood's Bay.
1890 .. **Corbett, H. H.,** M.R.C.S., 9 Priory Place, Doncaster.

—* .. Cordeaux, Mrs., Great Coates, R.S.O., Lincoln.
1908 .. Cowling, H., 10 Bradley Road, Silsden, near Keighley.
1907 .. Cozens, E. J., Preston Grammar School, Stokesley.
1896 .. **Crabtree, Arthur,** F.L.S., Merlewood, Halifax.
1912 .. Crawshaw, Miss Josephine E., Burnsi le, Ilkley.
1903 .. Croft, E. O., M.D., 28 Clarendon Road, Leeds.
1887 .. **Crossland, Charles,** 4 Coleridge Street, Halifax (Ex-President).
1896 . **Crowther, J. E.,** Portland Street, Elland.
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1903 .. **Culpin, H.,** 7 St. Mary's Road, Doncaster.
1908 .. Dalton, A. C., 22 Dunstall Street, Scunthorpe.
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1883 .. Dawson, Percival W., Etherington House, Newland, Hull.
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1908 .. Dennis, Thomas, 21 Peel Street, Hull.
1885 .. **Denny,** Prof. **Alfred,** F.L.S., 61 Ranmoor Crescent, Sheffield.
1903 **L.** Dent, Major J. W., Ribston Hall, Wetherby.
1899 .. Dewhurst, Algernon, Aireville, Skipton.
1908 .. Dixon, Dr. A. C., 12 Kendrew Street, Darlington.
1907 .. Dodson, H., Huntcliff House, Saltburn.
1910 .. Drake, Miss Annie, Thwing, near Hunmanby, E. Yorkshire.
1907 .. **Drake, H. C.,** F.G.S., 10 Oak Road, Scarborough.
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1906 .. **Dwerryhouse, A. R.,** D.Sc., F.G.S., Deraness, Deramore Road, Belfast.
— .. **Eddy, J. R.,** F.G.S., The Grange, Carleton, Skipton.
1898 .. Eden, Hon. Miss Agnes, Ford House, Wangford, Suffolk.
1910 .. Edmondson, F. H., 72 Devonshire Street, Keighley.
1901 .. Edmondson, Prof. T. W., M.A., New York University, University Heights, New York, U.S.A.
1904 .. Edwards, Rev. J. R. W., M.A., The Grammar School, Leeds.
1905 .. **Elgee, F.,** F.G.S., 23 Kensington Road, Middlesbrough.
1912 .. Elliott, Coun. Thos., Lincoln House, Heckmondwike.
1893 .. Elmhirst, C. E., 29 Mount Vale, York.
1897 .. Emerson, E. B., M.A., J.P., Swainby, Northallerton, Yorks.
1909 .. **Falconer, W.,** Wilberlee, Slaithwaite, Huddersfield.
1908 .. Fielding, W., 24 Ventnor Terrace, Halifax.
1892* .. **Fierke, F. W.,** 581 Anlaby Road, Hull.
1888 .. Fitzwilliam, Hon. W. H. W., M.P., Wiganthorpe, York.
1894 .. Foggitt, J. B., 32 Scarisbrick New Road, Southport.
1897 .. Foggitt, T. J., Stoneybrough, Thirsk.
— .. **Foggitt, William,** J.P., South Villa, Thirsk.
1911 .. Fordham, A. A., Andreas, Nunthorpe, S.O., Yorks.
1905 .. Fordham, W. J., M.R.C.S., Bubwith, Selby.
1909 .. Forrest, H. E., "Hill Side," Bayston Hill, Shrewsbury.
1887 .. **Fortune, Riley,** F.Z.S., 5 Grosvenor Terrace, East Parade, Harrogate.
1896 .. Foster, G., Castlestead, Boston Spa, R.S.O., Yorkshire.
1908 .. Foster, H., 48 Ridge Mount, Upper Armley, Leeds.
1908 .. Fowler, T. Marchant, Cranley, South Kirkby, Hemsworth.
1909 .. Fryer, Dr. J. H., East Gate, Barnsley.
1833 **L.** Gallwey, Sir Ralph P., Bt., M.B.O.U., Thirkleby Park, Thirsk. (Ex-President).
1885 .. **Gardner, John,** F.L.S., Laurel Lodge, Hartlepool, Co. Durham.

1908 .. Garstang, Prof. W., M.A., F.Z.S., University, Leeds.
1883 .. **Gaunt, Leonard,** Hazelbrae, Farsley, Leeds.
1886* .. Gaunt, Mrs. Leonard, Hazelbrae, Farsley, Leeds.
1887 .. **Gerrard, J.,** M.B.O.U., H.M. Inspector of Mines, Worsley, Manchester.
1898 .. **Gibbs, Thomas,** Bridge House, Wirksworth.
1904 .. Gibson, J., F.R.M.S., Elmfield, 192 Salter Lane, Sheffield.
1907 .. Gibson, Walcot, B.Sc., F.G.S., Geological Survey Office, 28 Jermyn Street, London, S.W.
1904 .. Glauert, Ludwig, Geol. Survey Office, Beaufort Street, Perth, W. Australia.
1910 .. Glendinning, J. W., Ash Villa, Huddersfield.
1905 .. Golledge, G. W., Rose Cottage, Hexthorpe, Doncaster.
1908 .. Gott, Emmott, 143 Park Row, Heaton, Bradford.
1883* .. Gough, Rev. Thomas, B.Sc., F.G.S., King Edward VI. School, East Retford.
1907 .. **Grabham, Oxley,** M.A., Museum, York.
1908 .. Grant, C. H., M.Sc., F.R.Met.S., 212 Burley Road, Leeds.
1908 .. **Greaves, A. E.,** 52 Cecil Street, Goole.
1894 .. Green, Upfield, F.G.S., 8 Bramskill Road, Harlesden, London, N.W.
1906 .. Gregory, E. E., 7 Burleigh Place, Darlington.
— * .. **Gregson, W.,** F.G.S., 512 12th Street, Edmonton, Canada.
1907 .. Grimshaw, P. H., Royal Scottish Museum, Edinburgh.
1908 .. Haigh, Chas., 32 Avenue Road, West Bowling, Bradford.
1887 .. Haigh, G. H. Caton, M.B.O.U., Grainsly Hall, Great Grimsby.
1902 .. Haley, W. B., 33 South Parade, Cleckheaton.
1889 **L.** **Hall, A. E.,** F.E.S., Cranfield House, Southwell, Notts.
1890 .. Hallimond, H. T., Percy Cottage, Emerald Street, Saltburn-by-Sea
1911 .. Hamilton, Major G. Barrett, B.A., F.G.S., Kilmarnock House, Campile, Waterford, Ireland.
1910 .. Hardy, C. J., 31 Hampton Road, Sheffield.
1909 .. Hargreaves, J. A., 2 Stepney Road, Scarborough.
— .. **Harker, Alfred,** M.A., F.R.S., St. John's College, Cambridge. (Past-President).
— * .. Harrison, John, 7 York Terrace, Whitby.
1908 .. Harrogate Public Library, c/o G. W. Byers, Victoria Avenue, Harrogate.
1897 .. Hartshorn, J., Leyburn, R.S.O., Yorkshire.
1885 .. Harvie-Brown, J. A., F.R.S.E., Dunipace House, Larbert, N.B.
1891 .. **Hawkesworth, Edwin,** Sunnyside, Crossgates, Leeds.
1907 .. Hawley, Sir H. C. W., Tumby Lawn, Boston, Lincs.
1908 .. Haxby, Fred, 11 Necropolis Road, Bradford.
1897 .. **Herdman, W.,** F.G.S., St. John's Chapel, Co. Durham.
— * .. **Hewett, William,** 12 Howard Street, Fulford Road, York.
1906 .. Hind, Wheelton, M.D., B.Sc., Roxeth House, Stoke-on-Trent. (Ex-President).
1898 .. Hinton, Amos, Hilda House, Middlesbrough.
1910 .. Hobson, Bernard, B.Sc., F.G.S., Thornton, Hallam Gate Road, Sheffield.
1907 .. Hodges, Isaac, M.I.M.E., F.G.S., Eshald House, Woolesford nr. Leeds.
1889* .. Hodsman, G., 8 Feversham Terrace, York.
— **L.** **Holgate, Benj.,** F.G.S., The Briars, North Park Avenue, Roundhay, Leeds.
1895 .. Hollingworth, J., M.R.C.S., 2 Hornsea Parade, Holderness Road, Hull.
1908 .. Holmes, John, 9 Campbell Street, Crosshills, near Keighley.
1884 .. **Horne, William,** F.G.S., Market Place, Leyburn, R.S.O., Yorks.

1909 .. Howard, G., Sitwell Vale, Moorgate, Rotherham.
1889 .. **Howarth, E.,** F.Z.S., Hilbre Nest, Crookes Moor Road, Sheffield.
1891 .. **Howarth, J. H.,** J.P., F.G.S., Somerley, Rawson Avenue, Halifax.
— .. Hoyle, W. E., Dr., M.A., National Museum of Wales, City Hall, Cardiff.
1907 .. Hudson, Baker, Memorial Museum, Middlesbrough.
1902 .. Hunter, John, 17 Hollins Road, Harrogate.
1883 .. Hurst, J. S., J.P., Copt Hewick Hall, Ripon.
1904 .. **Hutton, W. Harrison,** 44-46 Dial Street, Leeds.
1896 .. **Ingham, William,** B.A., 52 Haxby Road, York.
1885 .. Irvin, Rev. B., M.A., The Vicarage, Saltburn-by-the-Sea.
1904 .. **Irving, J.,** M.D., Inagh Mount, 13 Filey Road, Scarborough.
1890 .. Jackson, A. M., LL.D., Victoria Chambers, Hull.
1907 .. **Jackson, E. W.,** F.C.S., Godrevy, Saltburn-by-Sea, Yorks.
— * .. **Jackson, J.,** M.P.S., High Street, Wetherby.
1907 .. John Crerar Library, c/o H. Grevel & Co., 33 King Street, Covent Garden, W.C.
1904 .. **Johns, C.,** F.G.S., Burngrove, Pitsmoor Road, Sheffield.
1912 .. Johnson, H. E., 49 Bowling Hall Road, Bradford.
1904 .. **Johnson, J. W, H.,** B.Sc., York House, Thornhill, Dewsbury.
1907 .. **Johnstone,** Miss M.A., LL.A., B.Sc., F.L.S., 15 Birchvale Drive, Romiley, Cheshire.
1899 .. **Jones, J. A.,** B.Sc., F.G.S., Reethville, Park Road, West Hartlepool
1903 **L.** **Jones, R. Fowler,** 8 Lendal, York.
1903 .. Jordan, A., Claremont, Windsor Road, Doncaster.
1905 .. **Jowett, F.,** Vincent Street, Bradford.
1892 .. **Kendall, Percy F.,** M.Sc., F.G.S., Rose Dene, Weetwood, Leeds. (Ex-President).
1908 .. Kershaw, J. R., F.R.H.S., 10 Briggate, Brighouse.
1888 .. **Kidston, Robert,** LL.D., F.R.S., 12 Clarendon Place, Stirling.
— **L.** **Knubley,** Rev. **E. P.,** M.A., Steeple Ashton Rectory, Trowbridge, Wilts.
1906* **H.L.** Lamplugh, G. W., F.R.S., F.G.S., Geological Survey Office, 28 Jermyn Street, London, S.W. (Ex-President).
1904 .. Lane, A. C., Fern Cottage, Rastrick, Brighouse.
1911 .. Lane, Rev. G. J., F.G.S., The Manse, Upleatham Road, Saltburn-by-Sea.
1908 .. Laverack, Clive, Ph.D., Broughton Rise, Malton.
1902 .. **Lawton, Fred,** Carlton Terrace, Lane End, Skelmanthorpe, Huddersfield.
1893 .. **Leatham, Claude,** The Red House, Wentbridge, Pontefract.
1898 .. **Lee, John,** Hude Gate, Middleton-in-Teesdale, Darlington.
— .. **Lee, P. Fox,** Lowood, Dewsbury,
1907 .. Leeds Public Library, c/o T. W. Hand, Public Library, Leeds.
1896 .. Leetham, E., J.P., Aldersyde, Dringhouses, York.
1910 .. Legard, Digby, Headon Lodge, Brompton, R.S.O..
1889 .. **Lofthouse, J. H.,** Lyell House, 62 Dragon Parade, Harrogate.
1899 .. **Lofthouse, T. A.,** F.E.S., 129 Albert Road, Middlesbrough.
1910 .. Lotherington, E. B., 39 Grange Avenue, Scarborough.
1898 .. Lucas, B. R., 3 Dyer Terrace, Winnington, Northwich, Cheshire.
1907 .. **Lumby, A. Haigh,** 121 Horton Grange Road, Bradford.
1884 .. **Lund, Percy,** 57 Southfield Square, Bradford.
1909 .. McDonald, James E., 14 Ellen Street, Heaton Norris, Stockport.
1891 .. **McLean, Kenneth,** Pennine View, Harrogate.
1908 .. Malone, Michael, 3 Ingleby Street, Brownroyd, Bradford.
1905 .. March, H., 2 West Hill Terrace, Chapel Allerton, Leeds.
1903 **L.** **Margerison, Samuel,** Calverley, Leeds.
1905 .. Mason, F. A., 29 Frankland Terrace, Leopold Street, Leeds.
— .. **Massee, George,** F.L.S., V.M.H., Gateacre, Sandycombe Road, Kew Gardens. Surrey.

1901 .. Massey, Herbert, F.E.S., Ivy Lea, Didsbury, Manchester.
1912 .. Matthew, A. A., Hollin's Close, Queen's Drive, Ilkley.
1896 .. Melrose, J., Clifton Croft, York.
1894 .. Melvill, J. C., M.A., F.L.S., Meole Brace Hall, Shrewsbury.
1912 .. Mennell, J., 27 Nevile Street, York.
1907 .. Midgley, H., Kingston Cottage, Springhead, Anlaby, near Hull.
1908 .. Midgley, T., Chadwick Museum, Bolton.
1893 **L.** **Mills, F. W.,** Thornleigh, Huddersfield.
1905 .. Mitchell, E., 535 The Terrace, Meanwood Road, Hyde Park, Leeds.
1911 *.. Mitchell, Miss C. B., 535 The Terrace, Meanwood Road, Hyde Park, Leeds.
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1912 .. Moore, A., Peaseland Road, Cleckheaton.
1910 .. Moore, A. J., 9 Brook Street, Hull.
1900 .. Moore, H. H., 5 Olga Avenue, Cowersley, Milnsbridge, Huddersfield.
1906 .. **Morley, B.,** Wind Mill, Skelmanthorpe, Huddersfield.
1883 .. Morrison, Walter, J.P., Malham Tarn House, Settle.
1905 .. Morse, E. W., 9 Hill Top Mount, Roundhay Road, Leeds.
1906 .. Moses, G. W., West View, Bishop Auckland.
1899 .. Moss, C. E., D.Sc., F.R.G.S., Botany School, Cambridge.
1909 .. Musham, J. F., Haylands, Selby.
1886 . **Naughton, John,** Ellesmere School, Park View, Harrogate.
1889 .. **Naylor, E.,** Heather Bank, Hazelhurst Road, Bradford.
1894 .. Needham, James, Wood End. Hebden Bridge.
1887 .. **Nelson, T. H.,** M.B.O.U., Seafield, Redcar.
1885 .. **Newbitt, Thomas,** F.G.S., 17 Royal Crescent, Whitby.
1901 .. Newcomen, G. H. T., Kirkleatham Hall, Redcar.
1890 **L.** Newton, Rev. Canon H., Vicarage, Redditch.
1899 .. **Ostheide, Heinrich,** 91 Harehills Avenue, Leeds.
1890 **L.** Oxley, H., Spenfield, Weetwood, Leeds.
1888 .. Oxley, Rev. W. H., M.A., Petersham Vicarage, Surrey.
1900 .. Parkin, William, F.A.I., The Mount, Sheffield.
1906 .. **Parkin, W. H.,** Studholme, Shipley.
1910* .. Parsons, E. A., 108 Coltman Street, Hull.
— .. **Parsons, H., Franklin** M.D., Oakhurst, 4 Park Hill Rise, Croydon.
1909 .. **Patten, C. J.,** M.A., M.D., Sc.D., Professor of Anatomy, University, Sheffield.
1891 **L.** **Pawson, A. H.,** J.P., F.L.S., Howe Combe, Watlington, Oxon. (Ex-President).
1891 **L.** Pawson, Mrs. A. H., Howe Combe, Watlington, Oxon.
1893 .. **Peake,** Rev. **Edward,** M.A., Cathedral Choir House, Oxford.
— .. Pearson, H. W., Castle Howard Road, Malton.
1909 .. Peck, A. E., 33 Valley Road, Scarborough.
1905 .. Peck, M. C., Park Villa, The Valley, Scarborough
1910 .. Peel, Miss M. N., Knowlesmere Manor, Clitheroe.
1893 .. **Petch, T.,** B.Sc., B.A., The Lawn, Peradenirya, Ceylon.
1894 .. **Petty, S. Lister,** Dykelands, Ulverston.
1902 .. **Philip, R. H.,** 447 Beverley Road, Hull.
1901 .. Pickard, J. F., 22 Hessle Terrace, Burdenell Road, Leeds.
1911 .. Pickles, A., 56 Tufton Street, Silsden, Keighley.
1908 .. Pittaway, E., 4 Henley Villas, Adderbury Grove, Hull.
— .. **Pocklington, H.,** 11 Regent Park Terrace, Leeds.
— **L.** **Porritt, G. T.,** F.L.S., F.E.S., Elm Lea, Dalton, Huddersfield. (Ex-President).
— * .. Powell, Sir F. S., Bart., Horton Old Hall, Bradford.
1887* .. **Powys,** Rev. **H. A.,** M.A., Meanwood Vicarage, Leeds.
1902 .. **Pratt,** Rev. **Charles T.,** M.A., Cawthorne Vicarage, Barnsley.
1896 **L.** Priestley, F. N., Kingswood, Sholebroke Av., Chapeltown, Leeds.

1911 .. Priestley, Prof. J. H., The University Leeds.
1911 .. Priestman, G. E., Beaconsholme, Ilkley.
1890 .. Procter, J. W., Ashcroft, York.
1898 .. Punch, J. W. R., Hastoe House, Southfield Road, Middlesbrough.
1894 .. Punshon, Mrs. R. M., Ingleby House, Northallerton.
1883* .. Richmond, Rt. Rev. J. J. Pulleine, D.D., Bishop of, Stanhope Rectory, Darlington.
1908 .. Roberts, S., Jr., M.A., The Beeches, Park Grange, Sheffield.
1890* .. **Roberts, Walter,** F.R.G.S., Lynwood, Avenue Road, Doncaster.
1898 .. **Robertshaw, A. Gibson-,** Gordon Bank House, Midgley, Luddenden Foot, R.S.O.
1902 .. Robinson, A. S., B.A., M.B., Dundas Villa, Redcar.
1892 .. **Robinson, J. F.,** 22 Harley Street, Hull.
1908 .. Robinson, J. G., B.A., J.P., Cragdale, Settle.
1908 .. Robinson, J. H., Carlinghow, Batley.
1908* .. Robinson, Wilfred, B.Sc., 22 Harley Street, Hull.
1887 .. **Robinson, William,** Greenbank, Sedbergh.
1912 .. Roe, T. B., 9 York Place, Scarborough.
— .. **Roebuck, W. Denison,** F.L.S., 259 Hyde Park Road, Leeds. (Ex-President).
1907 .. Roose, T., Bolton Abbey, Skipton.
— **L.** **Rowntree, J. H.,** Scalby Mabs, Scarborough.
1911 .. Rowntree, Joshua, J.P., 12 Rawdon Villas, South Cliff, Scarbro'.
1909 .. Rushton, E., Oswaldkirk, York.
1901 .. Sachse, W., Asgard House, Linthorpe, Middlesborough.
1888 **L.** St. Paul, Major H., J.P., The Willows, Ripon.
1890 .. **St. Quintin, W. H.,** J.P., D.L., M.B.O.U., Scampston Hall, Rillington, York. (Ex-President).
1908 .. **Sanderson, A. R.,** 109 Lower Rushton Road, Thornbury, Bradford.
1897 .. Saner, C. O. F., 2 Elgin Villas, Anlaby Road, Hull.
1911 .. Sargent, Wm., 9 Brighton Street, Barrow-in-Furness.
1907 .. **Saunders, T. W.,** High Street, Brotten, Saltburn.
1889 **L.** Scharff, R. F., Ph.D., Tudor House, Dundrum, Dublin.
1905 .. Schwabe, A. L., 56 Market Street, York.
1911 .. Seward, Prof. A. C., M.A., F.R.S., Botany School, Cambridge (Ex-President).
1900 .. Sewell, J. T., Chubb Hill Road, Whitby.
1911 .. Shaw, Rev. H. H., M.A., Aughton Vicarage, York.
1886 .. Sheffield Central Free Library, c/o S. Smith, Surrey Street, Sheffield
1897 **H.L.** **Sheppard, T.,** F.G.S., F.R.G.S., The Museum, Hull.
1891 .. Shillito, John, J.P., 4 Park View, Hopwood Lane, Halifax.
— .. **Shuffrey,** Rev. **W. A.,** M.A., Arncliffe Vicarage, Skipton.
1905 .. Simpson, H., 17 Turner Street, Redcar.
1894 .. **Simpson, William,** F.G.S., Catteral Hall, Settle, Yorkshire.
1911 .. Sisson, H., Main Street, Sedbergh.
1899 .. Skipwith, Mrs. S. F., c/o Miss E. Ross, Wadsworth Hall, Doncaster.
1912 .. Slack, R., Heather Cottage, Kildwick, *via* Keighley.
1904 .. Slater, H., School House, Helmsley.
— .. **Slater, Matthew, B.** F.L.S., 84 Newbeggin, Malton.
1907 .. Smith, S. H., 2 First Avenue, Heworth, York.
1905 .. Smith, T., London Road, Alderley Edge.
1903 .. **Smith, W. G.,** B.Sc., Ph.D., College of Agriculture, George Square, Edinburgh.
1897 .. **Snelgrove, E.,** B.A., 61 Harcourt Road, Sheffield.
1909 .. Spencer, W. H., 29 Granville Road, How Street, Walthamstow.
1904 .. **Stainforth, T.,** B.A., 88 Ryde Street, Hull.
1904 .. Stather, A. J., 224A Spring Bank, Hull.
1891 .. **Stather, J. W.,** F.G.S., Brookside, Newland Park, Hull.
1911 .. Stead, J. E., F.R.S., 11 Queen's Terrace, Middlesborough.

1911 .. Stephens, Rev. Thos., Horsley Vicarage, Itterburn S.O., Northumberland.
1907 .. Steward, E. S., F.R.C.S., 10 Princes Square, Harrogate
1884 .. **Stiles, M. H.,** F.R.M.S., 10 Avenue Road, Doncaster.
1911 .. Stiles, W., B.A., The University, Leeds.
1899 .. Strother, T. W., F.Z.S, Westfield, Killinghall, Leeds.
1905 .. Stump, E. C., Polefield, Blackley, Manchester.
1911 .. Stutley, J. R., The Uplands, Batley.
1890 .. **Sutcliffe, J. W.,** Clifton Road, Shircoat, Halifax.
1908 .. Sykes, A. W., High Close, Kidroyd, Huddersfield.
1910 .. Sykes, M. L., F.R.M.S., 10, Headingley Avenue, Leeds.
1908 .. Tait, A., M.D., Lower House, Lepton, Huddersfield.
1899 .. Taylor, C. E., Akay, Sedbergh, R.S.O., Yorkshire.
1911 .. Taylor, E. W., Staircliffe, Mount Villas, York.
1909 .. Taylor, G. S., "Ingleby," Ben Rhydding, Yorks.
— .. **Taylor, J. W ,** North Grange, Horsforth, Leeds.
1910 .. Taylor, T. C., M.P., Sunny Bank, Batley.
1900 .. **Taylor, T. H.,** M.A., The University, Leeds.
1897 **L.** Teal, Joseph, Bankfield House, Yeadon.
— .. Tetley, C. F., M.A., J.P., Spring Bank, Headingley, Leeds.
1903 .. Thirkell, E. W., Aldwarke, Rotherham.
1911 .. Thomas H. Hamshaw, M.A., The Botany School, Cambridge.
1890 .. **Thomas, W. H.,** The Ness, Roman Road, Linthorpe, Middlesbro'.
1890 .. **Thompson, M. L.,** F.E.S., 40 Gosford Street, Middlesborough.
1911 .. Thornber, W., 205 Hyde Park Road, Leeds.
1894***H.L.** Tiddeman, R. H., M.A., F.G.S., 298 Woodstock Road, Oxford. (Ex-President).
1884 .. **Travis,** Rev. **W. T.,** M.A., The Rectory, Ripley, Leeds.
1909 .. **Trechmann, C. T.,** Ph.D., F.G.S., Hudworth Tower, Castle Eden.
1889 .. **Turner, B.,** 10 Pitt Street, Barnsley.
1907 .. Turner, J., Scholes Moor, Holmfirth, near Huddersfield.
1890* .. **Veitch, W. Y.,** M.R.C.S., 6 Southfield Villas, Middlesbrough.
1912 .. Waddington, Geo., Lollingham, Leeds.
1899 .. **Waddington, John,** F.E.S., 50 Harehills Avenue, Leeds.
1911 .. Waddington, Thos., Fairbank, Moorallerton, Leeds.
1907 .. **Wade, E. W.,** M.B.O.U., Middleburg, North Ferriby, E. Yorks.
1910 .. Wade, H., 10 Pitt Street, Barnsley.
1908 .. Wager, M. E., B.Sc., Cragg Road, Mytholmroyd.
1894 .. **Wager, Harold,** F.R.S., Hendre, Horsforth Lane, Far Headingley, Leeds.
1888* .. **Waite, Edgar R.,** F.L.S., Canterbury Museum, Christchurch, New Zealand.
1907 .. Wakefield, E. H., Elsinore, Dodworth Road, Barnsley.
1909 .. Walker, Herbert, Darwen Cottage, Grange-over-Sands, Lancs.
1909 .. Wallis, Anthony, M.A., Oalkeigh, South End Avenue, Darlington
1910 .. **Walsh, G. B.,** B.Sc., 6 Lancaster Road, Linthorpe, Middlesbrough.
— .. **Walsingham,** Rt. Hon. Lord, Merton Hall, Watton, S.O., Norfolk. (Ex-President).
1884 .. **Walton, F. F.,** F.G.S., 19 Charlotte Street, Hull.
1887 .. **Ward, Thomas F.,** Park Road South, Middlesborough.
1891 .. **Waterfall, Charles,** 'Dalmeny,' Shannington Avenue, Chester.
1906 .. Waterworth, H., 7 Kingsley Place, Halifax.
1885 .. **Watson, Arnold, T.,** F.L.S., Southwold, Tapton Crescent, Sheffield.
1903 .. **Wattam, W. E, L.,** 30 Town Gate, Newsome, Huddersfield.
1887 .. **Watts,** Rev. **A.,** F.G.S., Rectory, Wilton Gilbert, Durham.
1912 **L.** Waud, Geo. C., Ferniehurst, Baildon, Yorks.
1901 .. West, Prof. G. S., B A., F.L.S., University, Birmingham.
— .. **West, William,** F.L.S., 26 Woodville Terrace, Little Horton Lane, Bradford. (Ex-President).

1901 .. Wheldon, J. A., F.L.S., 60 Hornby Road, Walton, Liverpool.
1904 .. **Whitaker, A.,** Kingwell Close, Worsborough Dale, Barnsley.
1909 .. Whitaker, F. W., 10 Upper Howard Street, Batley.
— .. Whitaker, T. S., F.R.G.S., Everthorpe, Brough.
1897 .. Whitham, T., The Moorlands, Bramhope, Leeds.
1891 .. Whitley, J. H., B.A., M.P., Brantwood, Halifax.
1904 .. Wilcox, R. L., South Eastern Hospital, New Cross, London, S.E.
1893 .. **Wilkinson, H. J.,** 12 Minster Yard, York.
1894 .. **Wilkinson, Johnson,** M.B.O.U., Vermont, Huddersfield.
1903 .. Wilkinson, T., Rustic Cottage, Eldwick, Bingley.
1901 .. Wilson, Albert, F.L.S., F.R.Met.S., 28 St. James' Road, Ilkley.
1890 .. Wilson, H. J., M.P., Osgathorpe Hill, Sheffield.
— .. **Wilson, J. E.,** F.G.S., Dunholm, Ilkley-in-Wharfedale.
1906 .. **Wilson. W.,** Ryedale, Keighley Road, Colne, Lancs.
1908* .. Winter, A. E., Linaire, 25 Holbeck Hill, Scarborough.
1908 .. **Winter, George,** F.R.M.S., 25 Holbeck Hill, Scarborough.
1905 .. **Winter, W. P.,** B.Sc., Hope View, Moorhead, Shipley.
1910 .. Witty, H., 35 Nansen Street, Scarborough.
1890 .. **Woodhead, T. W.,** Ph.D., F.L.S., Hood Royd, Almondbury, Huddersfield.
1904 .. **Woods,** Rev. **F. H.,** B.D., Bainton Rectory, near Driffield.
1890 **L.** Wright, C. B. E., J.P., D.L., Bolton Hall, Clitheroe.
1901 .. **Wroot, H. E.,** Yorkshire Observer, Bradford.
— * .. Yewdall, E., 58 Wade Lane, Leeds.

LIST OF SOCIETIES

Affiliated with the Yorkshire Naturalists' Union, with the addresses of the Secretaries.

Barnsley Naturalists' Society.—H. Wade, 10 Pitt Street, Barnsley.
Bootham School Natural History Society.—T. H. Knight, Bootham School, York.
Bradford Scientific Association.—A. Smith, Springfield, Guisley, near Leeds.
Bradford Natural History and Microscopical Society.—F. Jowett, 2 Vincent Street, Bradford.
Brighouse Naturalists' Society.—J. Barwick, 16 Crescent, Bonegate Road, Brighouse.
Cleveland Naturalists' Field Club.—F. Elgee, 23 Kensington Road, Middlesbrough.
Craven Naturalists' Society.—T. H. Holmes, 20 Castle View Terrace, Skipton.
Crosshills Naturalists' Society.—J. Holmes, 9 Campbell Street, Crosshills.
Darlington and Teesdale Naturalists' Field Club.—M. Knox, 5 Balmoral Terrace, Darlington.
Doncaster Scientific Society.—G. H. Greenslade, Eastfield, Doncaster.
East Riding Nature Study Association.—W. J. Algar, School House, Lockington, near Beverley.
*Elland Naturalists' Society.—B. Harrison, 168 Westgate, Elland.
Greetland and West Vale Naturalists' Society.—W. Moore, 15 Crosshill, Greetland.
Halifax Scientific Society.—F. Barker, 11 Hall Street, Halifax.
Hebden Bridge Literary and Scientific Society.—E. B. Gibson, Croft Terrace, Hebden Bridge.
*Heckmondwike Naturalists' Society.—G. W. Parker, 13 Vernon Rd., Heckmondwike.
Honley Naturalists' Society.—A. Booth, 19 Oldfield Buildings, Honley, near Huddersfield.
Huddersfield Naturalists' and Photographic Society.—C. Mosley, 213 Lockwood Street, Lockwood, Huddersfield.
Hull Co-Operative Field Naturalists' Club.—E. Pittaway, 4 Henley Villas, Adderbury Grove, Beverley Road, Hull.
Hull Geological Society.—J. W. Stather, F.G.S., Brookside, Newland Park, Hull.
Hull Scientific and Field Naturalists' Club.—T. Stainforth, B.A., The Museum, Hull.
Hull Society of Natural Science.—A. J. Moore, 9 Brook Street, Hull.
*Leeds Conchological Club.—F. Booth, 18 Queen's Road, Shipley.
Leeds Co-Operative Naturalists' Field Club.—J. B. Drake, 54 Northbrook Street, Chapeltown, Leeds.
Leeds Geological Association.—E. Hawkesworth, Sunnyside, Crossgates, Leeds.
Leeds Naturalists' Club and Scientific Association.—C. H. B. Turner, 37 Sholebroke Place, Leeds.
Lindley Naturalists' and Photographic Society.—G. Kaye, 66 Rock Terrace, Lindley, Huddersfield.
Malton Naturalists' Society.—R. H. Smithson, 17 Yorkersgate, Malton.
North Eastern Railway Natural History and Scientific Society.—W. Hewett, 12 Howard Street, York.
Ovenden Naturalists' Society.—E. Roberts, 16 Melbourne Street, Lee Mount, Halifax.

Ravensthorpe Naturalists' Society.—C. Crowther, Netherfield Road, Ravensthorpe.

Rotherham Naturalists' Society.—G. Howard, Sitwell Vale, Moorgate, Rotherham.

Scarborough Field Naturalists' Society.—E. C. Horrell, 4 St. Thomas Street, Scarborough.

*Scarborough Philosophical and Archæological Society.—E. A. Wallis, Springfield, Scarborough.

Sheffield Junior Naturalists' Society.—H. H. Proctor, 17 Wadborough Road, Sheffield.

Sheffield Naturalists' Club.—C. Bradshaw, F.C.S., Public Museum, Sheffield.

South-West Yorkshire Entomological Society.—E. J. Hooper, Grosvenor Terrace, Middlestown, near Wakefield.

Spen Valley Literary and, Scientific Society.—A. Moore, Peaseland Road, Cleckheaton.

*Thirsk and District Naturalists' Field Club.—J. E. Hall, Market Place, Thirsk.

Wakefield Naturalists' Society.—A. Price, 20 Northfield Terrace, Wakefield.

York and District Field Naturalists' Club.—V.G.F. Zimmerman, 7 Portland Street, York.

Total number of members belonging to the Yorkshire Naturalists' Union 422
Total number of Subscribing Societies 41

CIRCULAR 215.]

Yorkshire Naturalists' Union.

President:
W. H. ST. QUINTIN, J.P., M.B.O.U., Scampston, York.

Divisional Secretary:
J. W. STATHER, F.G.S., Brookside, Newland Park, Hull.

Hon. Secretary:
T. SHEPPARD, F.G.S., F.S.A. Scot., Municipal Museums, Hull.

THE 215TH MEETING

WILL BE HELD AT

MARKET WEIGHTON,

ON

Saturday, May 8th, 1909.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland and N.E. Railways, which have booking arrangements for MARKET WEIGHTON, to Members and Associates of the Y.N.U., surrendering the Certificate noted below. Tickets taken on Friday, May 7th, will be available for return on Monday, May 10th. Where through bookings are not in operation Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by the Secretary of the Union. Members and Associates wishing for this Certificate must apply to Mr. Sheppard for it. At Stations on the N.E. Rly. and H. & B. Rly. tickets at the reduced fares will be issued on production of the signed card of membership.

BOOKS AND MAPS.—The whole area is included in Sheets 94 S.W. (New Series Sheet 72) of the One-Inch Ordnance Map, which may be obtained geologically coloured. See "Flora of the East Riding of Yorkshire" by J. F. Robinson; "Geological Rambles" by T. Sheppard, F.G.S.; "List of the Land and Freshwater Mollusca of the East Riding" by T. Petch, B.A., B.Sc.; Phillip's "Geology of Yorkshire"; Y.N.U. Circular 75, etc.

HEADQUARTERS.—Half Moon Hotel, Market Weighton.

ROUTES.—11 a.m. The Botanists, Entomologists, Conchologists, etc., will leave the station on the arrival of the trains from Hull and York, and proceed to the Common under the leadership of Mr. J. J. Marshall. The route taken will be towards the Reformatory and the Holme River head. The Geologists will proceed via Goodmanham to Kiplincotes and return to Market Weighton in another direction. Leader: Mr. J. W. Stather, F.G.S.

Leaders will be appointed for parties arriving in the afternoon.

PERMISSION to visit their properties has been kindly granted by Rev. A. G. Braund, and Robert Leighton, Esq.

GEOLOGY.—The Geological Section will be officially represented by its President, Dr. A. R. Dwerryhouse.

Dr. Dwerryhouse writes:—

The main feature of the area is the great chalk escarpment which forms the western boundary of the Yorkshire Wolds. It rises abruptly from the Triassic plain to the west to a height of about 200 feet and then more gradually until an altitude of 458 feet is reached at Heslesskew, whence the surface descends by the dip slope to the plain of Holderness.

The escarpment is continued both North and South of Market Weighton, and in the latter direction is continued across the Humber as the Lincolnshire Wolds.

The dip of the Chalk is generally eastwards at a low angle, rarely exceeding 3° to 4°, but local variations of direction are of frequent occurrence.

At the base of the Chalk near Market Weighton is a bed of Red Chalk which is well seen near the rifle butts, about 1½ miles east of the town and near the York, Market Weighton and Beverley branch of the North Eastern Railway, where specimens of *Belemnites minimus* have been obtained. The Red Chalk is also exposed along the course of the road from Market Weighton to Sancton, near the bend marked 206 on the survey map, where *Terebratula* and other fossils are to be found.

The Red Chalk rests unconformably on a denuded anticline of Jurassic Rocks, the axis of which runs in an east and west direction through Goodmanham, where, so great has been the pre-cretaceous denudation that the Chalk rests directly on the Lower Lias.

Tracing the outcrop of the Jurassic rocks towards the north the Middle Lias is seen to come in near Towthorpe corner and the Upper Lias near Partridge Hall; the Oolites however are not exposed in this direction within the limits of the map. They emerge from beneath the the Chalk in the neighbourhood of Great Givendale.

To the south of the anticlinal axis the Middle Lias appear about quarter-mile south of Goodmanham and the Upper Lias and Lower Oolites are seen before Sancton is reached. Southward from this point the Jurassic rocks appear in greater force and form a subsidiary escarpment to the west of the line of the wolds, and this gradually separates more and more widely from the Chalk Escarpment until in Lincolnshire the two features are quite distinct and are separated from each other by the valley of the Witham.

The absence of all the members of the Jurassic Series except the Lower Lias near Goodmanham is partly to be accounted for by the fact that the anticline suffered denudation before the deposition of the Chalk, and partly from the fact that the fold was in course of formation during Jurassic times and that consequent thinning out of many of the beds took place through default of deposition.

In the neighbourhood of North Cliff good sections of the Lower Lias are exposed while several members of the Lower and Middle Oolites can be seen between North Newbald and South Cave. The Lower Lias can also be seen in the clay-pits near the railway, half-a-mile to the east of Market Weighton where *Gryphæa incurva* and numerous plates of *Pentacrinus* are to be found.

Superficial Geology.—Mr T. Sheppard, F.G.S., writes:—"There are many interesting problems to be solved with regard to the origin of the gravels, etc., in the Market Weighton District, and special attention should be aid to the exposures. At Bielsbeck is an interesting marl deposit which has recently been excavated by the aid of a grant from the British Association. A large collection of remains of Mammoth, Bison, etc., has been secured, together with several freshwater shells, plant remains, etc. An interim report has been published in "The Naturalist," and the final report will shortly be issued by the British Association. This exposure was first made known many years ago, and a full description with lists of species appears in Phillip's "Geology of Yorkshire," 1875.

BOTANY.—The Botanical Section will be officially represented by Mr. J. F. Robinson.

Flowering Plants.—Mr. Robinson writes:—As the season is a late one and the Field Meeting very early, as compared with the first gathering of former years, it cannot be expected that many species of plants in flower will be in evidence on this occasion. In the "Flora of the E. Riding of Yorks.," published 1902, it will be noticed that I have given in Roman numerals the week of the month, when,

as a rule, the flowering time of each species is at its best with us; and making an allowance of seven days or so, it is very probable that the following will again be seen in the district:—*Teesdalia nudicaulis*, quite a number of violets, e.g *Viola palustris*, *V. odorata*, *V. hirta*, *V. silvestris*, *V. ericetorum* (a variety with bright yellow spur), *Cerastium semidecandrum*, *C. arvense*, *Montia fontana*, *Prunus Avium*, *Poterium Sanguisorba*, *Saxifraga tridactylites*, *Myosotis collina*, *Salix purpurea*, *Orchis mascula*, *Carex verna*, and the moonwort fern, *Botrychium lunaria*.

Lathræa squamaria, not yet recorded for the neighbourhood, should be looked for under hazel bushes.

Mr. J. J. Marshall adds:—*Berberis vulgaris* in hedgerows, *Arabis hirsuta*, *Erophila vulgaris*, *Sisymbrium Thalianum*, *Viola Riviniana*, *Trifolium striatum* (too early), *Vicia lathyroides*, *Veronica arvensis*, *Salix pentandra*, *Salix fragilis*, *Orchis ustulata*, *Orchis morio*, *Saxifraga granulata*. Grasses.—*Aira caryophyllea*, *A. præcox*. Ferns.—*Polypodium vulgare*, *Ophioglossum vulgatum*. *Chara hispida* and others should be examined.

Mosses and Hepatics.—The Yorkshire Byrological Committee will be officially represented.

Mr. J. J. Marshall writes:—**Mosses.**—As I resided here in the first flush of my moss studies, the surrounding district has been pretty well worked. The following are found within a radius of five miles:—*Pleuridium alternifolium*, *Anisothecium rubrum*, var. *callistomum*, *Anisotheciu m crispum*, *Seligeria paucifolia*, *Seligeria calcarea*, *Dicranium spurium*, *Dicranium undulatum*, *Ephemerum serratum*, *Phascum Floerkei*, *Phascum curvicolle*, *Pottia recta*, *Potti abryoides*, *Tortula brevirostris*, *Tortula papillosa*, *Mollia crispa*, *Barbula lurida*, *Orthotrichum Lyellii*, *Physcomitrella patens*, *Bryum inclinatum*, *Bryum pendulum*, *Bryum cernuum*, *Bryum bicolor*, *Bryum murale*, *Amblystegium elodes*, *Hypnum algirianum*, *Hypnum rutabulum*, var. *plumulosum*, *Cryphæa heteromalla*, *Pylaisia polyantha*. As this is a Saturday meeting, time will not allow all these to be gathered, though most of them will be in good condition.

Hepatics.—There are none known of any great rarity.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will be officially represented by its President, Mr. Riley Fortune, F.Z.S.

Mammalia.—Mr. J. J. Marshall writes:—The Badger and Otter are seen occasionally. Fox, Stoat, Weasel, Rat, Water Vole, Shrew, Water Shrew, Hare, Rabbit, Mice (not determined), Squirrel, Hedgehog, and Bats are more or less abundant.

Birds.—Mr. E. W. Wade writes:—The Market Weighton district is more famous for its past than present history, ornithologically speaking. Situated on the edge of the Yorkshire Wolds, close to the district where the late J. C. Swailes took the eggs of Pallas' Sand Grouse in 1888, and where Great Bustard and Stone Curlew were once common species; and to the plain of York, near the extensive heaths and warrens where Stone Curlew bred in comparatively recent times, where a vast tract of marsh and fen stretched away S.W. to the Humber, containing many duck decoys and a numerous population of fen birds; there is much to regret in the past glories of the place. But from the modern point of view it is perhaps one of the most attractive districts in the East Riding. In the neighbourhood are the estates of Londesborough and Warter, the finest game preserves in the Riding. A series of picturesque wooded valleys open up from the plain of York into the chalk hills, whilst the country in the vicinity contains a varied and attractive list of resident birds, comprising the following:—Redstart, Nightingale (occasional), Lesser Whitethroat, Golden-crested Wren, Wood Wren, Coal Tit, Marsh Tit, Tree-creeper, Yellow Wagtail, Hawfinch, Goldfinch, Tree Sparrow, Lesser Redpoll, Bullfinch, Reed Bunting, Jay, Swift, Nightjar, Great Spotted and Green Woodpeckers, Cuckoo; Barn, Long-eared, Tawny Owl; Sparrow Hawk, Kestrel, Heron, Mallard, Turtle Dove, Quail (occasional), Stone Curlew, Common Snipe, Little Grebe, etc.

Reptiles and Amphibia.—Mr. Marshall writes:—Adders, once frequent, have disappeared from their usual haunts. Frogs, Toads, Lizards, and Newts have been noted.

Fishes.—Trout, Pike, Perch, Roach, Eel, Bullhead, Stickleback.

CONCHOLOGY.—The Conchological Section will be officially represented by its President (Mr. W. Harrison Hutton), two of its Secretaries (Mr. J. F. Musham, and Mr. W. D. Roebuck, F.L.S.), and Mr. J. W. Taylor, F.L.S.

Land and Freshwater Mollusca.—Mr. Hutton writes :—This district was one of the late William Nelson's favourite hunting grounds for land and freshwater mollusca, and members attending should be able to make good records.

Mr. Denison Roebuck, F.L.S., writes :—The woods, etc., and chalk-pits N., E., and S., of Market Weighton, are likely to be productive and well worth working, and the Market Weighton Canal, the head of which is about 2 miles S.W., should be carefully examined, along with ponds and ditches in the same direction.

Certain species have not so far been examined and authenticated from the East Riding, and special search should therefore be made for *Milax sowerbyi*, *Arion subfuscus*, *Hyalinia helvetica*, *Zonitoides excavatus*, *Acanthinula aculeata*, (the discovery of this latter species would be most opportune, as it is one of the group now being worked up for the next part of Mr. Taylor's fine Monograph), *Hygromia fusca*, *Sphyradium edentulum*, various species of *Vertigo*, *Cæcilioides acicula*, *Pomatias elegans*, *Acicula lineata*, *Neritina*, *Sphærium rivicola*, *S. pallidum*, *Dreissena polymorpha*, etc.

The Conchologists will either divide into two parties, one going to the Canal, and the other 2 miles South to Houghton Hall and Sancton Woods ; or if uniting in one party will visit these woods and then make for the canal and home.

Pleistocene Mollusca.—At Bealsbeck (or Bielbecks) Farm, about two miles S.S.W., is an interesting deposit of probably Pleistocene Age, where numerous species of land and freshwater mollusca specifically identical with our present fauna are found fossil in association with the bones of the mammoth, bison, and other extinct mammals. Of this, Mr. T. Sheppard gave an interesting account in the Naturalist.

ENTOMOLOGY.—The Entomological Section will be officially represented.

Lepidoptera.—Mr. R. Lacy writes that he has obtained the following species : *Smerinthus ocellatus*, *Euchelia jacobææ*, *Spilosoma menthastri*, *Notodonta zizzac*, *Pygæra pigra (reclusa)*, *Odonestis Potatoria*, *Macrogaster castaneæ (arundinis)*, *Bupalus piniarius*.

Coleoptera.—The Yorkshire Coleoptera Committee will be officially represented.

Mr. T. Stainforth writes that although the immediate neighbourhood of Market Weighton does not appear to have been much worked for the Coleoptera, the district is a promising one.

Arachnida.—Mr. Stainforth writes :—Some interesting spiders were obtained last year in the Market Weighton district, including (new to Yorkshire) *Hahnia nava*, Bl., *Crustulina guttata*, Wid., *Agroeca proxima*, Camb., *Oxyptila atomaria*, Panz. Mr. G. B. Walsh, B.Sc., used to get the interesting water spider *Argyroneta aquatica*, Latr., in the flooded marl pits of the neighbourhood. *Trochosa picta* is common in sandy places about Bielsbeck, etc.

Some attention should be devoted to these interesting organisms. All the apparatus needed is a small test tube half filled with methylated spirits.

PROGRAMME OF MEETINGS :—

5–15 p.m. prompt, Meat Tea, 1/6 each,
6– 0 p.m., Sectional Meetings,
6–15 p.m.—General Meeting,
} At the Half Moon Inn.

Trains for Hull leave at 5-55, 7-33, and 9-0.

,, York ,, 5-35 and 8-22.

,, Selby and Leeds leave at 5-25, 6-2, and 8-7.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before May 15th to the Secretary of the Y.N.U., the Museum, Hull.

Yorkshire Naturalists' Union.

THE 216TH MEETING

WILL BE HELD AT

NEWTON,

FROM

Saturday, May 29th to Tuesday, June 1st, 1909,

FOR THE INVESTIGATION OF

BOWLAND.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland and N.E. Railways, which have booking arrangements for Clitheroe, to Members and Associates of the Y.N.U., surrendering the Certificate noted below. Tickets taken on Friday, May 28th, will be available for return on Wednesday, June 2nd. Where through bookings are not in operation Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by the Secretary of the Union. Members and Associates wishing for this Certificate must apply to Mr. Sheppard for it. At Stations on the N.E. Rly. and H. & B. Rly. tickets at the reduced fares will be issued on production of the signed card of membership.

HOTEL ACCOMMODATION.—The head-quarters will be at the "Hare and Hounds," Newton. Accommodation is very limited and practically only double beds are to be obtained. It is absolutely necessary that members should write *at once* to the Divisional Secretary in order to secure a bed.

Conveyances.—Conveyances will run from Clitheroe, but it is necessary that members should acquaint the Secretary *at once* as to the day and time they will arrive at Clitheroe, so that arrangements may be made for taking a party over to Newton. Return fares on Friday and Saturday 4/3.

Monday Excursion.—Conveyances will meet the train arriving at Clitheroe from Hellifield at 9-0 a.m. Fare 3/- return.

Special Note.—Three clear days' notice has to be given for the conveyances, otherwise they cannot be guaranteed. The utmost difficulty has been experienced in making these arrangements, and members are *specially* desired to let the Divisional Secretary know at once when they will arrive.

THE DISTRICT to be investigated is on this occasion the Northern portion of Bowland, the basins of the various streams which converge on Slaidburn, from the N., N.E. and N.W., as well as the immediate vicinity of Slaidburn itself. It is all high lying ground, above 400 feet and rising to 1216 feet at Whelpstone Crag, 1379 feet at Bowland Knotts, 1731 feet at Wolf hole Crag, and 1784 feet at Bolton Head Fell.

BOOKS & MAPS.—The whole area is included in two Sheets 59 (91 N.E.) and 60 (92 N.W.) of the one-inch Ordnance Map. Published geologically coloured.

PERMISSION to visit his estate has been kindly granted by Mr. W. Peel, of Knowlmere.

The following conditions must be observed :—No birds eggs or young to be taken, no rare plants to be rooted up and care be taken that the game be not disturbed.

ROUTES.—These must be arranged from day to day as it is impossible to fix them in advance.

GEOLOGY.—The Geological Section will be represented by its President, Mr. A. R. Dwerryhouse, D.Sc.

Mr. R. H. Tiddeman, M.A., F.G.S., writes (in the 1896 circular) that Bowland is a district which has been of late years, probably in consequence of its distance from railways, very little visited by geologists, but here John Phillips and Gilbertson got many of their best specimens. The rocks are all Carboniferous, and in descending order consist of Millstone Grits, Bowland Shales, Pendleside Grit (inconstant), Pendleside Limestone, Shales-with-Limestones, and Carboniferous Limestone (main mass). The greater part of the limestones about Whitewell, Knowlemere, and Dunnow, probably belongs to the Pendleside Limestone horizon, and the display of Reef-knolls is exceedingly good and characteristic. These in lower parts of the valleys, with the steep slopes of Bowland Shales above, surmounted by the escarpments of Millstone Grit ('Pendle Grit'), give great charm to Bowland scenery. The drive from Clitheroe to Whitewell is for the most part tame, though giving good views of Pendle and its range in the distance, and contrasts strongly with the vigorous features of the Forest of Bowland. Starting from one great anticline at Clitheroe, another will be met with at Whitewell, and a third at or near the Trough of Bowland. The second anticline is broken by faults between Browsholme and Knowlmere, which bring the Millstone Grit down to the Hodder near Knowlmere. The views of the Ingleborough chain from Bowland Knotts (Millstone Grit) are exceedingly fine on a clear day, and some interesting instances of ice-drift may be seen there.

BOTANY.—

Flowering Plants.—Mr. J. F. Pickard writes that there is much scope for the botanist and a large extent of comparatively unworked ground, especially in the northern and eastern portions of the dale. In some of the sparsely-wooded gills about Slaidburn and under Bowland Knotts possibilities are great, and it is a curious phenomenon that where the Yoredale shales border on the grit under Whelpstone Crag and about the Halstead beck, plants of such strongly contrasted soil-preference as *Cytisus*, *Convallaria*, and *Polypodium dryopteris* grow very near each other.

The head of Whitendale is but little known botanically and in it there is ground suitable for some montane rarities. Filmy-fern needs looking for in the cloughs, as it has been found in West Lancashire in similar places not many miles away. Stags' horn Club-moss, locally known as "Shepherd's crook," grows on the stony slopes, and Parsley Fern is plentiful in one locality. There is at least one bush of Juniper, so rare on grit, in Whitendale, and on Botton Head Fell *Rubus chamæmorus* abounds.

Wahlenbergia hederacea, so very local in Yorkshire, occurs on the banks of the stream nearer Dimsop, and at Sykes, along with *Drosera rotundifolia*, and near about the shooting lodge there is apparently a little limestone and one or two fir plantations, where some useful exploration might be done.

One of the most characteristic plants of Bowland is *Andromeda*, which is found in good plenty in many localities, and ascends to near 1500 feet near the "Trough," but always occurs on the level mosses, where also is likely ground for *Malaxis*, hitherto sought for in vain! *Listera cordata* is known profusely in more than one station, the two Vacciniums, *V. vitis-idæa* and *V. oxycoccos* flowering abundantly, and on Waddington Fell (to the South) there is a patch of *Trientalis*, amongst the bilberry but producing smaller blooms than usual.

A form of *Caltha minor*, I think rather approaching the species *C. radicans*, was discovered by myself above Stonefold in moor bogs, in 1895, but as two specimens only were preserved, and it has not since been re-discovered, any fresh information about it would be valuable.

About Newton, on the limestone, *Trollius*, *Thalictrum flavum* (rare among the hills), *Arenaria verna*, *Genista tinctoria*, *Helianthemum vulgare*, *Saxifraga granulata*, *Carduus heterophyllus*, *Primula farinosa*, *Menyanthes*, *Epipactis palustris*, *Botrychium*, and *Ophioglossum*, may be met with, and in wet meadows near The Heaning an *Orchis ericetorum* and *O. incarnata*, with intermediate forms, any fresh gatherings of which would be acceptable to Rev. E. F. Linton.

The narrow low-lying creeks, locally termed the Old Hodder, between Slaidburn and Newton, need well working. They have produced a number of usually more lowland species, and *Sparganium simplex* with narrower leaves and pedicels, possibly a hybrid, has been found here. *Viola carpatica* Borbas (Teste Dr. Drabble), an inland form approaching *V. curtisii* and known previously to Messrs. Wheldon and Wilson in West Lancs., was first found by me in Old Hodder as a *V. tricolor* form in 1894, and seen again in fair quantity last summer.

The Dunnow Estate, with its deep scar and wooded scree slope, contains many local species, *Potentilla alpestris* being one of the most unusual. There is a large coarse form of Agrimony with more resinous-scented foliage and likely to produce in autumn twin-seeded nutlets, which grows on the south slope of the Lesser Dunnow and needs further examination. *Verbascum thapsus* grows handsomely on the scars, and *Sedum fabaria* is in rich profusion in almost inaccessible places, along with the bright green fronds of Hartstongue and numerous bushes of *Rhamnus catharticus* and *Euonymus*.

It should be added that Miss Peel, of Knowlmere Manor, has made many interesting finds as additions to the local list. Also that any new records will be acceptable for the forthcoming supplement to Lee's Flora of West Yorkshire.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will be represented by its President, Mr. R. Fortune, F.Z.S., and one of its Secretaries, Mr. H. B. Booth, M.B.O.U.

Mammals.—Mr. W. Wilson writes that the Otter is occasionally seen, and that the Whiskered Bat has been reported from Mytton.

Birds.—Miss M. N. Peel writes that the following breeding birds may be observed. Ringouzel, Wheatear, Sedge Warbler, Garden Warbler, Wood Warbler, Long-tailed Tit, Creeper, Tree Pipit, Lesser Redpole, Hawfinch, Bullfinch, Kingfisher, Nightjar, Merlin, Kestrel, Long Eared and Tawny Owls, Redshank, Golden Plover, Woodcock, Coots. The following species are abundant :— Redstart, Gold Crest, Dipper, Grey Wagtail, Curlew, Sandpiper. Herons nested successfully at Knowlmere in 1907 and attempted to do so in 1908, but were disturbed. They bred at Harrop until 1906. I have no notes for 1907-8, but believe the birds were disturbed in 1907. The Stonechat occurs rarely, but does not breed. The Chiff Chaff has only been reported to nest on one occasion. The Blackcap breeds at Stonyhurst, and Grasshopper Warbler and Twite nest occasionally on Browsholme and Waddington Fells. The Dunlin is reported to nest on the highest Fells and the Black-headed Gull has several times attempted unsuccessfully to breed on Browsholme Fell. The Turtle Dove was observed for a few days at Knowlmere in the spring of 1907. Ravens, Peregrines, Common and Rough-legged Buzzards occur but are usually trapped on the high Fells.

Reptiles and Amphibia.—Mr. W. Wilson writes that reptiles appear to be very scarce in the district. There are practically no records. The Natterjack was reported from Mytton many years ago.

Fishes.—Mr. W. Wilson writes that Salmon, Trout and Minnows are to be found in the Hodder.

CONCHOLOGY.—This section will be officially represented by Mr. J. F. Musham. Mr. W. Denison Roebuck, F.L.S., writes that the Bowland district ought to be rich in mollusca, with its limestone formations and patches of woodland, but no one appears to have collected them except himself, in 1885, along a line extending from Mytton through Bashall Eaves to Whitewell, thence to Dunsop, Newton, Slaidburn, and by Stocks and Tosside to Long Preston. *Vertigo edentula* occurred in Bashall Moor Wood, *Limnæa palustris* in a dry roadside ditch near Cracow Hill, *Zonites fulvus* at Coat Rakes Bridge, *Arion subfuscus* at Hammerton Hall, *Balea* commonly at Slaidburn, *Helix sericea* at Angerham and Meanley, *Azeca tridens* v. *crystallina* at Whitewell, *Z. glaber* at Whitewell and Great Mytton and *Planorbis spirorbis* in a horse-trough at Grunsagill Bridge, while *Helix rupestris*, *H. arbustorum*, *Clausilia laminata*, *Z. radiatulus*, etc., were common on the lime. stone. The species of general distribution collected were *Z. nitidulus* (with one of var. *nitens* at Stocks), *Z. purus* and var. *margaritacea*, *Helix hispida* and var. *hispidosa*, *H. hortensis*, *Z. alliarius*, *Zua*, *H. rufescens*, *Limnæa peregra*, *L. truncatula*, *Ancylus fluviatilis*, *Agriolimax agrestis*, *Z. cellarius*, *Z. crystallinus*, *Clausilia rugosa*, *Arion ater*, *A. hortensis*, *A circumscriptus*, *A minimus*, *Pupa cylindracea*, and *H. rotundata*.

ENTOMOLOGY.—Mr. J. F. Pickard writes that the following Butterflies are fairly represented : *Pieris brassicæ*, *P. rapæ*, *P. Napi*, *Euchloe cardamines*, *Hipparchia tithonus*, *Cœnonympha pamphilus*, *Cynthia cardui*, *Vanessa atalanta* and *V. urticæ*, *Chrysophanus phlæas*, *Polyommatus alexis*. Amongst the Moths are *Macroglossa stellatarum*, *Hepialus humuli*, *Chelonia caja*, *Bombyx quercus*, *Saturnia pavonia-minor*, *Rumia cratægata*, *Abraxas grossulariata*, *Thyatira batis*.

PROGRAMME OF MEETINGS on Monday :—

4-0 p.m. Meat Tea, 1/6 each
4-30 ,, Sectional Meetings } At the Hare and Hounds, Newton.
5-0 ,, General Meeting

Time for conveyances to leave for Clitheroe must be made to suit members present.

Yorkshire Naturalists' Union.

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Dr. WHEELTON HIND, B.Sc., F.G.S., Stoke-on-Trent.

Divisional Secretary:

J. J. BURTON, F.G.S., Nunthorpe, S.O., Yorkshire.

Hon. Secretary:

T. SHEPPARD, F.G.S., F.S.A. Scot., Municipal Museums, Hull.

THE 217TH MEETING

WILL BE HELD AT

RUNSWICK,

On Saturday, July 10th, 1909.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland and N.E. Railways, which have booking arrangements for HINDERWELL, to Members and Associates of the Y.N.U., surrendering the Certificate noted below. Tickets taken on Friday, July 9th, will be available for return on Tuesday, July 13th. Where through bookings are not in operation Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

HOTEL ACCOMMODATION.—Those desirous of spending the week-end, will find accommodation at the Runswick Bay Hotel, but, at this season of the year, it is desirable that early application should be made for rooms to Mrs. E. Robinson (Postal Address, Runswick Bay Hotel, Hinderwell).

Terms.—Bed (single), breakfast, and dinner, 7/- per day; or for double beds, 6/- per day.

Meat Tea on Saturday evening at five o'clock, 1/6 each, at the Runswick Bay Hotel.

HEADQUARTERS.—Runswick Bay Hotel.

PERMISSION to visit their properties has been kindly granted by the Marquis of Normanby and Lady Palmer.

EVENING MEETINGS.—It is expected that there will be an informal discussion on Friday or Saturday evening on local Geological Problems, and perhaps also on subjects interesting to other than geological members.

ROUTES.—Investigators in all sections will confine themselves as far as possible to the coast. Botanists will investigate the flora of the undercliff and of the Banks and the short glens running inland.

GEOLOGY.—The Geological Section will be officially represented by Mr. J. W. Stather, F.G.S. (who will act as leader).

Mr. T. W. Saunders writes:—The Dogger or the parting between the Oolite and the Lias is seen to great advantage, capped by the Oolitic Sandstone and Boulder Clay, to the east and the west of the bay. At the west side the remains of some old iron works are to be seen, formerly known as the Albion Iron Works, where the Dogger was used or smelted along with Ironstone from the Main Seam or *Spinatus* Beds. Thousands of tons of Dogger, or what is known to the Cleveland miners as the Top Seam of Ironstone, were worked from about this neighbourhood forty or fifty years ago, and especially so further west at Rosedale Wyke, where a fine section can be seen and examined. It changes very quickly from an ironstone to a ferruginous sandstone. Associated with the Dogger is a band of pebbles, which can be traced wherever the Dogger crops out. Part of the strata which make up the section stands the weather very badly, and the pebbles are exposed in great variety, along with the casts of fossils which are much worn. I have collected in the district quite a number of fossils, including parts of Ammonites. A little to the west of the ironworks a section of the Dogger is seen, the top part being made up of bands of coal from 1/16 of an inch thick, giving a total thickness of about two feet. This coal seems to have been used in the smelting of the Dogger. At the east of the bay right through to Kettleness, the Dogger is well seen, especially in the old Kettleness Alum Quarries, where fossils from the Dogger may be collected. In the Kettleness area it has been well proven by bore holes put down by the Skinningrove Iron Company during the last two-and-a-half years or so. The borings give some remarkable results in the form of the well known changes of the Dogger, both in thickness of section and quality.

In some cases a very rich ironstone was reached, and in other cases it deteriorated to ferruginous sandstone. Some of the characteristic fossils which may be met with are as follows: *Natica cincta*, *Nerita pseudocostata*, *Turbo laevigatus*, *Turritella quadricostata*, *Modiola denticulata*, *Trigonia denticulata*, *Astarte elegans*, and *Rhynchonella obsoleta*, with various fragments of Ammonites and Belemnites.

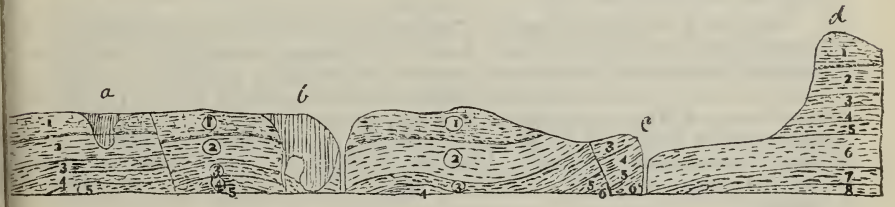
After leaving the Dogger the *Communis* Zone with its characteristic Ammonites is passed over, and next in order we have the *Serpentinus* Zone ; we then pass on to the *Annulatus* Zone, thence to the beach where we have the *Spinatus* Zone, or the main seam of Cleveland Ironstone, which has been the making of Cleveland. Any one desirous of collecting specimens from the strata will have ample opportunity of doing so, as this ground, if worked, will be found to be rich in fossils.

General Features.—Mr. J. J. Burton, F.G.S., writes :—The position of Runswick Bay marks the site of an ancient pre-glacial valley where it debouched upon the sea shore. From boring and sinking indications it seems that this bay has been the former outlet of a very considerable stream ; and as the large stream at Staithes where it cuts through the cliffs is entirely post glacial, Staithes beck and its contributory streams no doubt flowed into Runswick Bay in pre-glacial times. The outlet on the recession of the ice became blocked with boulder clay, and the inland valleys were filled with the same material. The melting of the ice on its lateral edges caused streams to flow, which, cutting into the boulder clay deposits, formed some of the valleys as we now see them, that is, more or less parallel valleys or deep gorges separated by a strip or ridge of boulder clay. This phenomenon is very clearly seen in the two streams of Easington and Grinkle, and also in the two parallel streams entering the sea at Sandsend and East Row respectively, a little North and South (or more correctly N.W. and S.E.) of Runswick. A fault throws the strata down about fifty feet to the West, but owing to landslips it is not readily seen except where it crosses the stream.

The shore line near Kettleness is chiefly formed of the *Spinatus* Beds of the Middle Lias with a very attenuated seam of the main ironstone cropping out, but on the opposite, that is the Runswick, side of the bay the ironstone beds are below the surface and do not re-appear for some distance to the North-West.

During the excursion the investigations will be chiefly on the Upper Lias, excellent sections of which are well seen on both sides of the bay and in the great Alum Works of Kettleness.

The following section will give a general indication of the strata of the coast line hereabout.



1.—Lower Oolite.
2.—*A. communis*
3.—*A. serpentinus* } Upper Lias.
4.—*A. annulatus* }
5.—*A. spinatus* } Middle Lias.
6.—*A. margaritatus* }
7.—*A. capricornus* } Lower Lias.
8.—*A. jamesoni* }

a. Kettleness.
b. Runswick Bay.
c. Staithes.
d. Boulby=Rockcliffe.

The little fishing village of Runswick Bay is one of the most picturesquely situated places on the coast, the houses nestle in irregular order up the steep face of the cliff from the shore line to the top. It is a short distance from Hinderwell, which is the nearest Railway Station on the Saltburn and Whitby line.

BOTANY.—The Botanical Section will be officially represented.

Mosses and Hepatics.—The Yorkshire Bryological Committee will be officially represented by by Mr. C. A. Cheetham.

Mr. R. Barnes writes :—The district to be investigated offers many advantages to the bryologist, and will be found well worth exploring, and especially so in regard to species preferring a sandstone or clay formation. Any of the little glens between the Esk and the Tees will be found intensely interesting. The following is a list of the rarer Mosses and Hepatics known to occur in that district :—*Georgia Brownii*, *Polytrichum aloides* var. *Dicksoni*, *Fissidens exilis*, *Fissidens exiguus*, *Fissidens viridulus*, *Fissidens incurvus* var. *tamarindifolius*, *Fissidens fontanus*, *Fissidens cristatus*, *Archidium alternifolium*, *Pleuridium axillaris*, *Pleuridium alternifolium*, *Ditrichum homomallum*, *Dicranella crispa*, *Dicranella secunda*, *Anisothecium rufescens*, *Anisothecium crispum*, *Anisothecium crispum* var. *elatum*, *Anisothecium squarrosum cum fructu*, *Brachydontium trichodes*, *Dicranum fuscescens*, *Dicranum Scottii*, *Oncophorus Bruntoni*, *Ephemerum serratum*, *Acaulon muticum*, *Tortula aloides*, *Tortula marginata*, *Tortula augustata*, *Tortula mutica*, *Tortula papillosa*, *Mollia crispa*, *Mollia squarrosa*, *Mollia rutilans*, *Mollia tenuis*, *Mollia tenuirostris*, *Barbula lurida cum fructu*, *Glyphomitrium polyphyllum*, *Glyphomitrium saxicola*, *Anœctaugium mougeotii*, *Zygodon stirtoni*, *Orthotrichum stramineum*, *Orthotrichum tenellum*, *Orthotrichum pulchellum*, *Weissia ulophylla* var. *crispula*, *Weissia phyllantha*, *Schistostega osmundacea*, *Pohlia annotina*, *Bryum lacustre*, *Mnium pseudopunctatum*, *Amblystegium irriguum*, *Amblystegium varium*, *Amblystegium kochii*, *Amblystegium polygamum*, *Ambystegium ochraceum*, *Hypnum cæspitosum*, *Hypnum pallidirostre*, *Hypnum crassinerve*, *Hypnum Teesdalei*, *Hypnum glareosum cum fructu*, *Hypnum plumosum* var. *Mildei cum fructu*, *Hypnum flagellare*, *Stereodon polyanthos*, *Isopterygium depressum*, *Plagiothecium latebricola*. **Hepatics.**—*Blepharozia pulcherrima*, *Kantia arguta*, *Cephalozia catenulata*, *Cephalozia pallida*, *Cephalozia curvifolia*, *Cephalozia Francisci*, *Hygrobiella laxifolia*.

CONCHOLOGY.—The Conchological Section will be represented by Mr. W. Harrison-Hutton.

ENTOMOLOGY.—

Coleoptera.—The Coleoptera Committee will be represented by its chairman, Mr. M. L. Thompson, F.E.S.

Mr. M. L. Thompson writes :—The following beetles have been taken in the neighbourhood of Runswick and Staithes : *Gymnusa brevicollis*, *Ocypus morio*, *Dianous cærulescens*, *Gecdromicus nigrita*, *Ancyrophorus omalinus*, *A. aureus*, *Choleva velox*, *Limonius minutus*, *Campylus linearis*, *Dasytes ærosus*, *Polydrusus confluens*, and *Hypera variabilis*. It is a good opportunity for working the seashore for the species of *Dyschirius* and *Bledius* (burrowing in the sands), *Heterothops binotata*, species of *Cafius*, *Myrmecopora uvida*, *M. sulcata* (under seaweed), and the curious little *Aëpus marinus* (beneath masses of Zostera), at high watermark.

PROGRAMME OF MEETINGS.—

5 p.m. prompt, Meat Tea, 1/6 each,
5-30 p.m., Sectional Meetings,
5-40 p.m., General Meeting
} At the Runswick Bay Hotel.

Trains for Whitby, Scarbro', Malton, York, etc., leave at 6-25 p.m.
6-25 p.m.

Trains for Saltburn, Middlesbro,' at 5-44 and 9-11 p.m.

Members must consult time tables, as the train service will probably be improved in July.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before July 18th to the Secretary of the Y.N.U., the Museum, Hull.

CIRCULAR 218.]

Yorkshire Naturalists' Union.

THE 218TH MEETING

WILL BE HELD AT

SEDBERGH,

On Bank Holiday Week-End,

July 31st to Aug 2nd, 1909.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland and N.E. Railways, which have booking arrangements for SEDBERGH, to Members and Associates of the Y.N.U., surrendering the Certificate noted below. Tickets taken on Friday, July 30th, will be available for return on Wednesday, August 4th. Where through bookings are not in operation Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

THE DISTRICT.—The greater part of Sedbergh is both physically and geologically part of the Lake District, which is, as Prof. Hull aptly describes, an isolated reproduction of North Wales, separated therefrom by a wide expanse of sea, the floor of which is underlaid by strata of more recent age than those of which the two mountainous ranges are composed. The whole is surrounded by rocks of Carboniferous age, except that portion lying between Black Comb (of Skiddaw age) and St. Bees Head.

HEADQUARTERS will be at the White Hart Hotel, Sedbergh. Bed, breakfast, sandwiches for luncheon, and dinner, 7/- a day. Members requiring accommodation must write to Mr. Bracken without delay.

BOOKS AND MAPS.—The whole area is included in Sheets 39, 40, and 49 of the One-Inch Ordnance Map. Published geologically coloured.

PERMISSION to visit their properties has been kindly granted by Mr. Upton, of Ingmire Hall; Mr. Burra, of Gate, Dent; Mr. Boustead, of Settlebeck; Mr. Gornall, of Helmside; and others.

ROUTES.—These will be arranged by the various sections after arrival.

GEOLOGY.—The Geological Section will be officially represented by Mr. Cosmo Johns, F.G.S.; and Mr. E. Hawkesworth.

Mr. Johns writes:—One of the most striking geological features of the district is the evidence of the existence of an ancient river valley, in which the sediments of the "Red Conglomerate" were laid down, and which later formed the estuary to which the shales, mudstones, and dolomites of the Lower Limestone shales seem to be confined. Such evidence as is now available points strongly to the upper old Red Sandstone age of the Red Conglomerates. The almost total absence of records of organic remains from these deposits is significant, but need not deter workers from making a systematic search in the fine sections which will be visited. The Lower Limestone Shales are interesting in that they represent the very oldest Carboniferous rocks of the county, and may be correlated with the Tournaisian of South Wales and Belgium. Owing to the conditions under which they were laid down, the formal evidence is scanty, and the beds represent a facies distinct from the typical areas.

Mr. W. Robinson writes:—The pronounced upheaval of the Lake District is continued right up to the Dent portion of the Pennine fracture, the downthrow on the east being between 2,000 and 3,000 feet. The Coniston series, so well seen at Clapham last year, reappear on the west side of the fault, their exposure being due to the folding and crumpling of the rocks, coupled with this general upheaval. The downthrow at Clapham (and at Ingleton), is on the west side.

The lowest rocks here seen are the Caradoc and Bala groups. Though greatly faulted and folded they are fairly well exposed in the Cautley Valley, and are here accompanied by much volcanic and igneous material. Exposures of lavas and beds of ashes, apparently contemporaneous with the deposition of the Bala Limestone, will be visited and described, so also will be the splendid section about a mile away, described by Prof. Hughes in vol. xvi. (plate 6), of the proceedings of the Yorkshire Geological Society, which section the professor says "is the most complete I know of in the lower beds of the Silurian and the upper beds of the Bala series."

Some time will be devoted to an examination of the two dissimilar conglomerates at the base of the Carboniferous rocks, as they are rarely found, as here, in near juxtaposition. The lower one (the old Red), is exceedingly coarse, and contains angular and sub-angular fragments of the underlying rocks, and might have been, it is suggested, torrentially deposited during that immeasurable length of geological time following the upraising of the old Silurian sea-bed, when the northern part of Britain was mountainous land continuous with Scandinavia, and the Lake Hills and the Howgill Fells constituted features far exceeding in size their existing dimensions. The other conglomerate, at a slightly higher horizon, green in colour, and containing quartz pebbles, is doubtfully conformable to the lower, and certainly forms the base of the lower Limestone shales, and may be also of the Carboniferous series. Both these conglomerates and the lower shales are well seen in Nor Gill, where they are tilted at high angles like manuscripts on a bookshelf, and can there be studied with great facility.

Superficial Geology.—The moraines of glaciers and other evidences of ice action should be noted, especially the crescent-shaped drumlins at the turn into the Lune Valley; as well as the notched outline of Middleton Fell, connected as it is with a series of ascending parallel lines of ice flow, well seen at Brackensgill, where they cause cascades in the waterfall; and a recent exposure of deeply grooved rock on the Golf Links, the origin of which is open to discussion.

An instance of a valley in the making may be discerned at the base of Barfell (wrongly spelled Baugh Fell on the Ordnance Maps), and across the line of weakness on Rysell.

BOTANY.—The Botanical Section will be officially represented.

Flowering Plants.—Mr. John Handley, J.P., writes:—The following is a list of wild flowers likely to be found in the neighbourhood of Sedbergh: *Hieraciums* in great variety and some very scarce, *Rubus saxatilis*, *Ribes alpinum*, *Meum athamanticum*, *Listera cordata*, *Pyrus communis*, *Galium boreale*, *Pyrola media*, *Thalictrum minus*, *Alchemilla alpina*, *Centaurea cyanus*, *Paris quadrifolia*,

Habenaria albida, *Erigeron acre*, *Gentiana Amarella*, *Saponaria officinalis*, *Orobanche major*, *Lathræa squammaria*, *Geranium pheum*, *G. sylvaticum*, *Saxifraga stellaris*, *S. aizoides*, *Senecio saracenicus*, *Stachys ambigua*, *Epimedium alpina*, *Drosera rotundifolia*, *Pinguicula vulgaris*, *Primula farinosa*, *Parnassia palustris*, and many others.

Mr. J. F. Pickard writes :—There is a rich field for the Botanist in all directions from Sedbergh; but on the beetling slate crags about Cautley and Black Force much valuable work may still be done. *Pyrola secunda* ought to be looked for in the steep heather and scree, at the head of the Black Force gill. Rich golden masses of *Saxifraga aizoides* will also be noticed here. At Cautley grows the *Alchemilla alpina* in profusion, and on the wet rocks *Hymenophyllum unilaterale*, *Melica nutans*, *Sedum fabaria*, four kinds of *Lycopodium*, Parsley Fern, and *Epilobium alsinifolium* can be found here. Other plants of the district are *Sedum anglicum*, *Saxifraga stellaris*, *Meum athamanticum*, *Circæa intermedia*, *Galium boreale*, etc., and there is a rich variety of *Hieracia* to be met with on the rocky stream banks and scars. Careful examination of the Rawthey bank should reveal *Agrimonia odorata*, discovered here by Mr. E. J. Lumb, and recorded some years ago in the "Naturalist," by the late Mr. W. West, junr. The plant is coarser and stouter than *Agrimonia eupatoria*, has odorous glands, and the fruit has twin nutlets. Any information respecting it would be valuable. The banks of the Dee in Dentdale have a quantity of *Campanula rapunculoides*, probably introduced, yet rapidly spreading among the coarse herbage on the river banks near Gawthrop. Some of the gills in the Baugh Fell group, and further north, require exploration. Uldale and its tributaries require further research, and the mountain turf tops should be examined for *Salix herbacea*, known near Whernside, but not recorded for Sedbergh. There is an old record for Juniper on the Howgill Fells ; if re-found it is likely to be *Juniperus nana*. A few doubtful records needing confirmation might be added. The ground should be searched for *Vicia orobus*.

Other uncommon plants are *Primula farinosa*, *Narthecium ossifragum*, *Habenaria bifolia*, *Gymnadenia conopsia*, *Malaxis paludosa*, *Epimedium alpinum*, *Parnassia palustris*, *Comarum palustre*, *Erigeron alpinus*, etc. *Geranium pheum*, not uncommon in and around Brigflatts, is probably a garden escape.

Mosses and Hepatics.—The Yorkshire Bryological Committee will be officially represented by Mr. Wm. Ingham, B.A., the Chairman.

Mr. Ingham writes :—The Sedbergh district is very rich in *Bryophytes*. There are many records, of which the following are a few of the most interesting :

True Mosses.—*Polytrichum alpinum*, *Bartramia Œderi*, *B. Halleriania*, *Neckera crispa* var. *falcata*, *Barbula rigidula*, *Hypnum examulatum*, var. *pinnatum* forma *acuta*, and *H. intermedium*, all by the Rawthey River on Baugh Fell ; *Rhabdoweisia denticulata*, *Grimmia conferta*, *Dicranella secunda*, and *Barbula rubella* var. *ruberrima* at Cautley Spout ; *Swartzia montana* var. *compacta* by Clough River ; *Weisia crispata*, *W. verticillata*, and *Philonotis calcarea*, by Cross Haw Beck ; *Bryum inclinatum*, *Anoectangium compactum*, and *Hypnum falcatum* var. *gracilescens*, by Taith's Gill ; *Eurhynchium Teesdalei*, by Hebblethwaite Beck ; and *Plagiothecium depressum*, at Uldale Fall and by Hebblethwaite Beck.

Sphagna.—*S. subnitens* var. *flavescens*, *S. recurvum* vars. *amblyphyllum* and *mucronatum*, *S. parvifolium*, and *S. papillosum* forma *sub-laeve*, by the Rawthey River ; *S. Gravetii* and *S. cymbifolium var. fusco-rubescens*, by Taith's Gill.

Hepatics.—*Metzgeria pubescens*, by Hebblethwaite Gill ; *Lejeunea cavifolia* var. *planiuscula*, *Scapania purpurascens*, by Cross Haw Beck ; *Scapania aspera*, *Mylia Taylori*, and *Lepidozia Pearsoni*, by the Rawthey River, the first also by Hebblethwaite Gill ; and *Lophozia incisa*, by Taith's Gill.

Mr. C. Cheetham writes :—The best district for mosses is at Cautley Spout, where the whole vegetation is of a lake district type. The following are a few of the best from my own gatherings here : *Andreæa petrophila*, *A. Alpina*, *A. Rothii*, *Oligotrichum hercynicum*, *Polytrichum nanum*, *Diphyscium foliosum*, *Seligeria recurvata*, *Brachyodus trichodes*, *Rhabdoweisia fugax*, *Dicranum secunda*, *Blindia acuta*, *Campylopus atro-virens*, *Fissidens osmundoides*, *Grimmia Doniana*, *Barbula*

spadicea, *B. rigidula*, *Weisia curvirostris* var. *commutata*, *Eucalyptra ciliata*, *Bartramia ithyphylla*, *B. pomiformis* var. *crispa*, *Webera elongata*, *W. cruda*, *Neckera pumila*, *Hedwigia ciliata*. Other rare mosses which have been found in this district are: *Bryum Duvalii*, *Œdipodium Griffithianum*, *Tetraplodon mnioides*, *Clinclidium stygium*.

VERTEBRATE ZOOLOGY.—

Mammalia.—Mr. R. Fortune writes that most of the common mammals may be seen. Information is especially desired about the bats.

Birds.—Mr. R. Fortune writes:—Sedbergh is a paradise for birds, though the time of year is unfavourable, as most of the songsters will be silent. Amongst the rarer birds nesting in the vicinity are: Peregrine Falcon, Sparrow Hawk, Kestrel, Merlin, Buzzard, Long-Eared, Barn, and Tawny Owls; occasionally also the Short-Eared Owl. On the moors Curlews and Golden Plovers are abundant, and in one locality the Dunlin nests regularly, and occasionally the Dotterel. The Red Back Shrike nests nearly every year. Most of the Tits are abundant. The three species of Wagtails are also plentiful, and the White Wagtail has nested. Kingfishers and Dippers are abundant on the streams, the Stonechat has nested, and Twites are found nesting regularly. Most of the smaller breeding species are to be met with.

Reptiles and Amphibia.—Mr. R. Fortune writes:—The Adder and Lizard are common on the moors. There is little information about the Newts, members may profitably investigate the distribution of this family.

Fishes.—Mr. R. Fortune writes:—Trout are abundant, and in the season Salmon and Sea Trout are fairly plentiful. Minnow, Bullhead, Loach, and Eels are also found.

CONCHOLOGY.—

Land and Fresh Water Mollusca.—Mr. F. Booth writes that he visited the district on June 19th of this year, working the Rawthey Valley and Cautley Spout. This is on the slate and not very productive in shells. Conchologists would be well advised to work in the direction of Baugh Fell up the Garsdale Valley, or the Dent Valley, as they would then get on to the Limestone. The following are the species noted in the Rawthey Valley, the best find being *Hygromia fusca* in a small wood or spinney on the river side; *Vitrina pellucida*, *Hyalinia cristallina*, *H. alliaria*, *H. nitidula*, *H. pura*, *Pyramidula rotundata*, *Hygromia rufescens*, *H. fusca*, *H. hispida*, *Helix hortensis*, *Azeca tridens*, *Cochlicopa lubrica*, *C. lubrica* var. *hyalina*.

Slugs.—*Arion ater*, *A. intermedia*, *A. hortensis*, *A. circumscriptus*, *Agriolimax agrestis*, *A. lævis*, *Limax arborum*.

ENTOMOLOGY.—

Coleoptera.—Mr. M. L. Thompson, F.E.S, writes:—The mountainous district of Sedbergh will prove an interesting locality for the coleopterist. In the immediate neighbourhood the following beetles have been taken: *Bembidium atrocæruleum*, *Cychrus rostratus*, *Staphylinus stercorarius*, *Ocypus cupreus*, *Cychramus fungicola*, *Parnus prolifericornis*, *Serica brunnea*, *Dolopius marginatus*, *Apion onopordi* (all in Donker Gill), *Carabus catenulatus*, *Leistus rufescens*, *Pterostichus vitreus*, *P. nigrita*, *Hydroporus melanarius*, *H. morio*, *Aphodius ater*, *A. lapponum*, *A. putridus*, *Corymbites cupreus* var. *æruginosus*, *Coutorhynchus ericæ* (all on the slopes of Baugh Fell).

PROGRAMME OF MEETINGS.—(Monday).

5-0 p.m. prompt, Meat Tea, 1/6 each,
5-30 p.m., Sectional Meetings,
5-45 p.m., General Meeting,
} At the White Hart, Sedbergh.

Trains for Leeds and Ingleton leave at 4-46 and 7-26 (for Ingleton only).
Train for Lowgill leaves at 6-31.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before August 18th to the Secretary of the Y.N.U., the Museum, Hull.

Yorkshire Naturalists' Union.

President:

W. H. ST. QUINTIN, J.P., M.B.O.U., Scampston, York.

Ex-Presidents:

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John Gilbert Baker, F.R.S., F.L.S., Kew.
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W. Eagle Clarke, F.R.S.E., Edinburgh.
Charles Crossland, F.L.S., Halifax.
Dr. Wheelton Hind, B.Sc., F.G.S., Stoke-on-Trent.

Divisional Secretary:

A. WHITAKER, Saville House, Worsborough Bridge, Barnsley.

Hon. Secretary:

T. SHEPPARD, F.G.S., F.S.A. Scot., Municipal Museums, Hull.

THE 219TH MEETING

WILL BE HELD AT

BARNSLEY,

On Saturday, August 28th, 1909,

FOR THE INVESTIGATION OF

CAWTHORNE DISTRICT.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland and N.E. Railways, which have booking arrangements for Barnsley, to Members and Associates of the Y.N.U., surrendering the Certificate noted below. Tickets taken on Friday, August 27th, will be available for return on Monday, August 30th. Where through bookings are not in operation Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by the Secretary of the Union. Members and Associates wishing for this Certificate must apply to Mr. Sheppard for it. At Stations on the N.E. Rly. and H. & B. Rly. tickets at the reduced fares will be issued on production of the signed card of membership.

PERMISSION to visit their properties has been kindly granted by Sir Walter Spencer Stanhope, K.C.B., and the Rt. Hon. Lord Allendale.

ROUTES.—The whole of the party will leave the top of Regent Street, Barnsley, at 10-15 a.m. prompt, and be conveyed by motor bus to Cawthorne. The starting point named at the top of Regent Street is within five minutes' walk of the G.C., Midland, and L. & Y. Railways, and within two minutes' walk of the Central Chambers, where the evening meetings will be held, and members may leave any coats, bags, or other luggage which they will not require again until evening.

All members intending to be present must book seats for the motor bus by sending in their names to the Divisional Secretary, Mr. Arthur Whitaker, Saville House, Worsbrough Bridge, so that they may be received not later than Thursday, August 26th. The fare will be 6d. per head.

On the arrival of the party at Cawthorne at about 10-45 a.m., an interval of one hour and a quarter will be allowed, to give those members who wish, an opportunity of obtaining lunch, and also to give time for members to examine the interesting collection of specimens and objects, many of particular local interest, to be viewed in the Cawthorne Museum, to which all members will have free admission during the day.

The whole of the members will leave Cawthorne at twelve noon. The geological party, under the guidance of the Rev. Chas. T. Pratt, and the remainder of the members under the leadership of Dr. Fryer, and Mr. B. Morley.

GEOLOGY.—The Rev. C. T. Pratt writes:—The solid geology of the district presents only the usual features of the Middle and Lower Coal Measures. In the lower part of the village, there is an outcrop of the Silkstone Seam, where it is being privately worked. The spoil heap of the Stanhope Silkstone Colliery, to the east of the village, will yield abundance of the freshwater mollusc, *Anthracosia carbonarius.* Many of the local fossills will be seen in the small village museum, which the Museum Committee invites members to visit, and where the programme of the geological section will be explained.

Superficial Geology.—So far there has been no discovery of glacial drift reported within the area of the day's excursion. Members will have their attention called to two large erratics outside the Museum, discovered by the writer some years ago. They are of the cleaved volcanic ash that is found in the Lake Country. They are mentioned in the report of the Yorkshire Boulder Committee, 1896-7, and on page 421 of the Proc. of the Yorkshire Geological Society, vol. xv., part iii. A description of them was given in "The Naturalist" for August, 1902, p. 258. Their presence in a locality supposed to be free from erratics will suggest questions on the glaciation of the neighbourhood, such as those of which Mr. Lower Carter offers an explanation in his paper on the "Glaciation of the Don and Dearne Valleys."

BOTANY.—The Botanical Section will be officially represented.

Flowering Plants.—Mr. W. E. L. Wattam writes:—A considerable number of plants will be met with, amongst which should be the following, viz.:—*Ranunculus aquatilis, Chelidonium majus, Sisymbrium officinale, S. alliaria, Barbarea vulgaris, Isatis tinctoria, Lotus major, V. sepium, Genista tinctoria, Rosa arvensis, Agrimonia Eupatoria, Fragaria vesca, Arctium lappa, Carduus lanceolatus, Inula dysenterica, Hieracium boreale, H. pilosella, Betonica officinalis, Stachys palustris, Tamus communis, Nuphar luteum, Scrophularia nodosa, Euphrasia officinalis, Rhinanthus crista-galli, Scutellaria galericulata, Reseda luteola, Stellaria graminea, Campanula latifolia, C. rotundifolia, Calystegia sepium, Myosotis arvensis, Circæa lutetiana, Linum catharticum, Juncus glauca, Euphorbia exigua, E. peplus, Asperula odorata, Lychnis flos-cuculi, L. vespertina, Silene inflata, Orchis maculata, Digitalis purpurea, Geranium dissectum, G. molle, Artemisia vulgaris, Lathræa squamaria.*

SEDGES :—*Carex axillaris, C. remota, C. paludosa, C. elongata, C. lævigata.*

GRASSES :—*Bromus asper, B. mollis, B. sterilis, Milium effusum, Triticum caninum, T. repens, Briza media, Agrostis alba, A. vulgaris, Arrenatherum avenaceum, Brachypodium sylvaticum, Avena flavescens, Hordeum murinum, Poa trivialis, P. pratensis, Glyceria aquatica, G. fluitans.*

HORSETAILS :—*Equisetum arvense, E. sylvaticum, E. palustre, E. limosum.*

Mr. F. Batley supplies the following list of flowering plants, which occur in the district principally in the disused canal between Barnsley and Cawthorne Basin : *Reseda luteola, Spirea ulmarea, Myrrhis odorata, Agrimonia Eupatoria, Valeriana officinalis, Hieracium umbellatum, Hypochæris radicata, Betonica, Bidens cernua, B. tripartita, Elodea Canadensis, Habenaria viridis, Alisma plantago, Sagittaria sagittifolia, Sparganium ramosun, S. simplex, Acorus calamus, Petasites vulgaris.*

VERTEBRATE ZOOLOGY.—The Vertebrate Section will be officially represented by Mr. A. Whitaker.

Mammalia.—Mr. A. Whitaker records the following species : Long-eared Bat, Noctule, Pipistrelle, Daubenton's and Natterer's or Reddish-grey Bat, all in the area to be worked, and probably the Hairy-armed or Leisler's, and Whiskered Bats also, as both are found in the near neighbourhood. The Hedge-hog, Mole, Common Shrew, Fox, Stoat, Weasel, Squirrel, Common Mouse, Brown Rat, Common Field-vole, Bank-vole, Water-vole, Common Hare, and Rabbit, are all fairly plentiful in suitable haunts. The Water Shrew, Otter, Wood Mouse, and Harvest Mouse occur, but are much more rarely met with. There are no recent records of the Pine-Marten (last taken at Cawthorne in 1878), Polecat, or Wild Cat, all formerly to be found, but now probably extinct. It is not impossible that the Badger may be again discovered in the district.

Birds.—Mr. J. Armitage writes :—The following among many others occur in or near the district to be investigated, and may be met with. Those species marked with an asterisk are known to have bred in the district within the last few years: Hobby, Merlin, *Kestrel, *Sparrow Hawk, *Tawny Owl, *Barn Owl, *Long-eared Owl, Pied Flycatcher, *Redstart, *Whinchat, Wheatear, *Sedge Warbler, *Garden Warbler, Blackcap, *Wood Warbler, *Chiff-Chaff, Gold Crest, Cole Tit, *Marsh Tit, *Great Tit, *Blue Tit, *Long-tailed Tit, Nuthatch, *Grasshopper Warbler, *Tree Creeper, Grey Wagtail, *Yellow Wagtail, *Pied Wagtail, *Tree Pipit, *Reed Bunting, Corn Bunting, Brambling, *Tree Sparrow, Goldfinch, Hawfinch, *Lesser Redpoll, Linnet, Twite, *Bullfinch, *Carrion Crow, Hooded Crow, *Magpie, *Jay, *Great Spotted Woodpecker, Lesser Spotted Woodpecker, *Cuckoo, *Kingfisher, *Nightjar, *Ring Dove, *Stock Dove, *Turtle Dove, *Red-legged Partridge, Golden Plover, *Green Plover, Grey Plover, *Redshank, *Snipe, Jack Snipe, Woodcock, *Common Sandpiper, Heron, Water Rail, *Land-rail, Spotted Crake, *Canada Goose, Shoveller, *Teal, *Mallard, *Tufted Duck, Pochard, *Great-crested Grebe, *Little Grebe.

Amongst rare and casual visitors mention may be made of the Rough-legged Buzzard, Wryneck, Bohemian Waxwing, Great Northern and Red Throated Divers, Marsh Harrier, etc. Local specimens of several of these will be seen by members who look round the collection of Birds in Cawthorne Museum.

CONCHOLOGY.—This Section will be officially represented by Mr. W. Harrison Hutton.

Land and Fresh Water Mollusca.—Mr. W. E. Brady has worked the Cawthorne district, but says that he has not found it rich in land molluscs. The following, amongst other species, may be expected : *Hyalinia fulva, H. excavata, Helix aculeata, H. aspersa, H. nemoralis, H. hortensis, Bulimus obscurus, Clausilia bidentata*, and *Cochicopa lubrica*. Cannon Hall lake contains *Limnea peregra, L. auricularia, Ancylus fluviatilis, Unio tumidus, U. pictorum, Anadonta cygnaea, Sphaerium lacustre*, etc.

Near Kexboro, *Helix hortensis*, which is abundant, should be worked for the variety *lurida*, the colour of the bands being unusual in some specimens, good examples of var. *conoidea* are also present. In the same locality *Helix nemoralis* furnishes, with other varieties, v. *rufo-fasciata* and brightly coloured examples of v. *lateritia*.

Land and Fresh Water Mollusca.—Mr. W. E. L. Wattam writes :—The following species have been noted, viz :—*Zonites alliareus*, *Z. cellareus*, *Z. crystallinus*, *Cochlicopa lubrica*, *Helix hortensis*, *H. nemoralis*, *H. rotundata*, *Limnea peregra*, *L. auricularia*, *L. stagnalis*, *Unio pictorum*, *Anodonta cygnea*, *A. anatina ;* the three last in the lake in Cannon Hall Park.

ENTOMOLOGY.

Coleoptera.—Mr. E. G. Bayford writes that very little appears to be known of the Beetle fauna of the district to be investigated. At Silkstone Fall Wood, about three miles away, the rather uncommon Longicorn, *Leiopus nebulosus* has been taken. *Attilabus curculionoides* has also been met with. The heavy rainfall last month, succeeded by the hot weather which persists at the present time, should produce a good crop of fungi, so attractive to many species of beetles. The many fungus-loving *Staphylinids*, from the large *Staphylinus Leisto-tropus* downwards, *Mycetophagus*, and the numerous species of Clavicorns, should also be looked for, the latter being boxed and carefully examined for the rarer species. *Carabus monilis*, always an uncommon beetle, has also been met with at Cawthorne.

Lepidoptera.—Mr. B. Morley writes :—The following species of lepidoptera should be met with in Deffer Wood : Larvæ of *Notodonta camelina*, *N. dictæoides*, *N. dromedarius*, *Acronycta leporina*, *Cymatophora duplaris*, etc., should be obtained from birch, and perfect insects of the following are more or less common : good forms of *Cidaria unmanata* and *C. russata ;* red forms of *Hypsipetes sordidata*, and brown forms of *Cidaria testata* from heather ; *Cosmia paleacea*, *Noctua dahlii*, *Triphosa dubitata*, are also common. Black *Agriopis aprilina* have been taken, but probably the date is too early for the species, a remark which applies to *Calveampa retusta* which also occurs. Good forms of *Polia chi* will no doubt be found on the walls about the village, and many common autumn species which visit the sugar patches about this time may be seen.

PROGRAMME OF MEETINGS.—

6-0 p.m. prompt, Meat Tea, 1/9 each, at the Queen's Hotel, Barnsley.

7-0 p.m., Sectional Meetings,
7-10 p.m., General Meeting,
} At the Barnsley Naturalists' Society's rooms, Central Chambers, Church Street, Barnsley (five minutes from either station).

Trains leave Barnsley for Hull (H. & B.), 8-44 ; Sheffield (Mid.), 8-20 and 10-15 ; (G.C.), 9-15 : Doncaster (G.C.), 8-52 ; Leeds (Mid.), 8-44 ; (L. & Y.), 9-3 : Wakefield (L. & Y.), 9-3 ; Penistone and Huddersfield (G.C.), 9-11 ; and Huddersfield (L. & Y.), 9-3 p.m., etc.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before September 12th to the Secretary of the Y.N.U., the Museum, Hull.

CIRCULAR 220.

Yorkshire Naturalists' Union.

President:

W. H. St. QUINTIN, J.P., M.B.O.U., Scampston, Yorks.

Hon. Secretary:

T. SHEPPARD, F.G.S., F.S.A. Scot., Municipal Museums, Hull.

THE 220TH MEETING

WILL BE HELD AT

CASTLE HOWARD

For a Fungus Foray

IN THAT NEIGHBOURHOOD

From Saturday, Sept. 18th, to Thursday, Sept. 23rd, 1909.

Chairman of Mycological Committee:

GEORGE MASSEE, F.L.S., V.M.H., of the Royal Herbarium, Kew.

Hon. Sec. Mycological Committee:

CHAS. CROSSLAND, F.L.S., 4 Coleridge Street, Halifax.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B. L. & Y., L. & N. W., Midland, and N.E. Railways, which have booking arrangements for CASTLE HOWARD, to Members and Associates of the Y.N.U., surrendering the Certificate noted below. Tickets taken on Friday, September 17th, will be available for return on Friday, September 24th. Where through bookings are not in operation Members may book to most convenient junction, and re-book to destination, the reduced fare being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by the Secretary of the Union. Members and Associates wishing for this Certificate must apply to Mr. Sheppard for it. At Stations on the N. E. Rly. and H. & B. Rly. tickets at the reduced fares will be issued on production of the signed card of membership.

PERMISSION to visit his charming Castle Howard Estates has been kindly granted by the Earl of Carlisle.

THE GENERAL MEETING ROOM will be at the Castle Howard Temperance Hotel. Unfortunately all other accommodation will have to be sought at the village of Welburn. This has been secured so far as can be, and application for rooms must be made through Mr. C. Crossland.

ROUTES.—These will be arranged each evening for the following day. Members will assemble at Headquarters on the Saturday afternoon.

On one of the evenings Mr. Massee will address the members, the subject being "The Origin and Tendencies of Parasitism in Fungi."

The usual Business Meeting of the Mycological Committee will be held on the Tuesday evening.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland and N.E. Railways, which have booking arrangements for SCARBOROUGH, to Members and Associates of the Y.N.U., surrendering the Certificate noted below. The Tickets will be issued on Friday, the 10th December, and will be available for returning up to and including the Monday, December 13th, 1909. Where through bookings are not in operation Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

At Stations on the North Eastern Railway, Saturday and Week-end Tickets will be issued at single fares for the double journey (minimum, 2/- Third Class). Similar Tickets are issued from many Stations on other Companies' lines.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by the Secretary of the Union. Members and Associates wishing for this Certificate must apply to Mr. Sheppard for it. At Stations on the N.E. Rly. and H. & B. Rly. tickets at the reduced fares will be issued on production of the signed card of membership.

TARIFF.—Members staying the week-end may do so, there being plenty of accommodation at the Grand Hotel. The tariff is 10/6 per day.

PROGRAMME.

11=30 a.m.—Excursion to

(1)—White Nab and Cornelian Bay, along the South Shore.

(2)—To Horner's Quarry, Falsgrave (Geological), to inspect the Cornbrash. Permission to visit the quarry has kindly being granted by Mr. E. Horsman. Both excursions start from the Museum at 11-30 a.m.

Mr. D. W. Bevan writes:—The Quarry to be visited is in a hillside facing Oliver's Mount, the two enclosing the little Valley called Ramsdale. Members interested in the glaciation of this district should refer to Prof. Kendall's paper for his views on this Valley. *Quarterly Journal.*—Geol. Soc., No. 231, p. 553 et seq. The bottom of the valley cuts deeply into the Upper Estuarine Shales, worked in the quarry for brick making. The Shales are overlaid by the Cornbrash, of which there is a good section. It consists for the most part of a very hard irony limestone full of fossils in splendid condition, but very difficult to get out, including large numbers of *Lima rigida*, *L. gibbosa*, *Pecten demissus*, *P. lens*, *Goniomya*, *V-scripta*, *Ostrea flabelloides* and *Macrocephalites macrocephalus (Am. Hervevi)*. The blocks of Cornbrash, falling as the shale is cut away, are broken up at intervals by blasting, and these are the best times to obtain fossils. Standing in the quarry and looking across to Oliver's Mount, one can easily trace the outcrop of the Cornbrash, as a hump half-way down the hill, left by the weathering of the Estuarine below, and the Kellaway and Oxford Clay above, while the steep summit is kept by the Calcareous Grit.

The Kellaway is also seen at the top of our quarry, but the Oxford Clay has been removed so thoroughly that a strip of gently-sloping cultivated land lies on this side of the Valley between the outcrop of the Kellaway and that of the Calcareous Grit.

On looking again at Oliver's Mount, the Cornbrash along with the other beds, is seen dipping to the south. It soon reaches the high-road, where its durability forms a conspicuous hump, and attains sea level a little farther south, where in Cayton Bay there is another good collecting ground for Cornbrash fossils.

12=30 to 2=0 p.m.—Luncheon

May be obtained at the Grand Hotel.

The 48th Annual Meeting will be held in the Museum.

3=0 p.m.—Sectional Meetings

(which all members and Associates are entitled to attend) will be held for the election of Officers of Sections, and to receive the Annual Reports from their Secretaries.

3=30 p.m.—The General Committee at the Museum (each member of which receives a special summons with this circular) will meet to consider the Annual Report, to elect Officers, and to arrange the Excursion Programme for 1910.

5=15 p.m.—Meat Tea at the Grand Hotel, at 1/6 each.

6=15 p.m.—The General Meeting

will be held at the Grand Hotel. The Chair will be taken by the President of the Union, supported by prominent members. After the reading of the Annual Report and the announcement of the Excursion Programme for 1910, at

6=45 p.m.—The Presidential Address

will be delivered by Mr. W. H. St. Quintin, J.P., M.B.O.U. Subject:—"Some Notes on Aviculture." The chair will be taken by His Worship the Mayor (Councillor W. Ascough, J.P.), supported by the President of the Scarboro' Field Naturalists' Society (E. B. Lotherington, Esq.), and the President of the Scarboro' Philosophical and Archæological Society (M. C. Peck, Esq.)

7=45 p.m. to 10=30 p.m.—Conversazione.

Exhibition illustrating Nature in the Scarboro' district, including, amongst others, the following objects:—Birds' Eggs and Ornithological Photographs; Marine Life; Local Mollusca, marine and non-marine; Lepidoptera; Maritime (Halophytic) Plants; Local Mycetozoa; other Fungi and Photographs; Microscopic Life; a selection of Fossils from the Middle Chalk and Cornbrash; also a series of Shells of the Genus *Conus*. Members intending to be present must send a card to Mr. E. A. Wallis, Springfield, Scarborough, and should also state whether they will be present to tea at 5-15.

Light Refreshments will be kindly provided by the Scarborough Field Naturalists' Society.

Cards of Membership.

The production of these is absolutely necessary for the obtaining of N.E. railway tickets at reduced fares, and for admission to the various meetings.

Members who have lost or mislaid their cards may have others on application to the Secretary, enclosing a stamped addressed envelope.

Associates may obtain theirs through the Secretary of their own local Society.

Railway Time Table.

Trains leave Scarborough for :—

North Eastern Railway	Darlington	10	0	p.m.
	Hull	8	28	,,
	York	10	0	,,
	Leeds	10	0	,,
	Bradford	9	0	,,

Election of Additional Members of General Committee

Voting papers are not sent out this year, but members may vote by postcard addressed to the Secretary, making their choice from the List of Members.

The Museum.

Scarborough Museum practically owes its inception and design to William Smith, the geologist. Its circular portion, the "pepper-box," was built in 1829 to exhibit to advantage local fossils and minerals, of which the combined private collections of Hinderwell and Williamson formed a respectable nucleus. Gifts of curios, and objects alien to geology were not, however, refused, so the Museum gradually acquired a diversified character. As a consequence two wings had to be erected in 1861, and an enlargement of the West wing undertaken in 1886. The total outlay, for site, buildings, and cases, alone, up to this date, was nearly £4,000. Crippled finances and diminishing enthusiasm ended in a long period of depression and inactivity, during which the Museum suffered severely—many valuable organic exhibits perishing through neglect. Then the Field Naturalists' and Photographic Societies came to the help of the Philosophical and Archæological Society, debt was removed, funds were obtained, and now improvements are being pushed forward steadily. It is hoped, in time, to make all departments not only presentable to the public but available for education. In the Upper Gallery, a series of twin wall-cases show birds of the district in natural surroundings. Adjoining table-cases contain British and Foreign recent shells in process of re-arrangement. Geologists will be interested in the Coast Section newly painted on the parapet of the Gallery. It is now reversed, the original view making the strata appear as seen from the land instead of from the sea. In the Rotunda, the Harper collection of birds—most of them having been shot in the district—claims attention. They were all overhauled a year or two ago, but lack of adequate heating renders perfect preservation a difficulty. The mineral cases are being put in order, but the work is not yet completed. Fossils are deposited in the East wing, many of them being excellent specimens, and the majority of them local. No attempt, as yet, has been made to alter their arrangement. The West wing contains the library, considerably augmented, the books having being re-arranged, many re-bound, and all catalogued. A fine male human skeleton, and oak-tree coffin, removed from a Gristhorpe tumulus in 1834, occupies a prominent case in the Library. Members will find many interesting archæological and ethnological objects in various parts of the building.

During the visit Members and Associates of the Y.N.U. will be admitted to the Museum free.

NEW MEMBERS.—A special effort is being made to get a good list of new members for the Scarborough Meeting. Towards this the Hon. Secretary would be glad to receive any nominations. The Subscription is 10/6 per annum, and members receive the *Naturalist*, *Transactions*, etc., free. The new volume of the *Naturalist*, commences on January 1st.

CIRCULAR 222.]

Yorkshire Naturalists' Union.

THE 222ND MEETING

WILL BE HELD AT

MIDDLETON-IN-TEESDALE,

ON

Whit Week-end, May 14th to 17th,

1910.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland and N.E. Railways, which have booking arrangements for MIDDLETON-IN-TEESDALE, to Members and Associates of the Y.N.U., surrendering the Certificate noted below. Tickets taken on Friday, May 13th, will be available for return on Tuesday, May 17th. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by the Secretary of the Union. Members and Associates wishing for this Certificate must apply to Mr. Sheppard for it. At Stations on the N.E. Rly. tickets at the reduced fares will be issued on production of the signed card of membership.

BOOKS AND MAPS.—The whole area is included in Sheets 25 and 31, new series; and 102 N.E., 102 S.E., old series, of the One-Inch Ordnance Map, which may be obtained geologically coloured.

See Y. N. U. circulars, Nos. 81 and 135; also J. G. Baker's "North Yorkshire."

THE DISTRICT to be investigated includes: An area bounded on the S.E. by Limedale; on the North by the River Tees, from the junction of the Lune with the Tees up to Cauldron Snout; on the West by Maize Beck, where it forms the boundary line between Yorkshire and Westmorland for about two miles; and from this point by a line to Lune Head, enclosing Mickle Fell (2591 ft.), and intersecting the road from Middleton to Brough under Stainmore.

HEADQUARTERS.—The Cleveland Arms Hotel, Middleton-in-Teesdale.

TERMS.—7/6 per day, including bed, breakfast, dinner, sandwiches, and attendance. The number of beds in the hotel is very limited, but members intending to be present should write in good time to the landlord, Mr. Ward, and he has undertaken to provide sleeping accommodation outside. There will be no difficulty in accommodating all who apply.

In order that proper accommodation may be provided it is absolutely necessary that those who desire seats in the brakes should advise Mr. J. J. Burton, Rosecroft, Nunthorpe, S.O., in respect of both Saturday's and Monday's excursions *not later than the morning of May 12th.*

Accommodation will only be provided for those who so apply for it.

EVENING MEETINGS.—On the Saturday evening a discussion on the Geology of the District will be introduced by Mr. Cosmo Johns, F.G.S.

It is hoped that members of other sections will come prepared to read papers or discuss other Natural History Subjects, and not leave the field entirely to the Geologists.

LEADERS.—Mr. W. Robinson, Mr. J. J. Burton, Mr. George Hodsman, and Mr. W. Walton.

ROUTES :—

FRIDAY.—Those arriving on Friday will find a delightful walk along Hudeshope Beck, (Skears' Beck), adjoining the town.

SATURDAY.—On arrival of the 8-6 a.m. train, brakes will take the party to High Force, where all will alight.

All sections will then take the Yorkshire side of the River Tees, if possible, and proceed up stream as far as time will permit. The Geologists, after examining the Whin Sill and altered shales and other phenomena at High Force, will cross the river if fordable, but if in flood proceed on the North Bank as far as Cronkley Bridge, and there cross into Yorkshire; examine the Whin Sill and saccharoid Limestones at White Force, the disturbance caused by the Burtreeford Dyke, and the exposure of Silurian Shales from which slate pencils were manufactured, and then proceed by Cronkley Scars past Falcon Clints to Cauldron Snout, and return by Widdy Bank to Langdon Beck. All will return to Middleton-in-Teesdale from Langdon Beck and High Force Inns.

(Circumstances may necessitate a slight deviation from the above programme).

May 15th.—For those who desire it, a quiet, short, but extremely interesting walk has been arranged.

MONDAY.—On arrival of 8-6 a.m. train take Brakes from the Station to Limedale; see Limedale Whinstone quarries and dykes; the Tees Valley Water Board Reservoirs and sections of the trench; walk to Grains-o'-th'-Beck Bridge; see exposure of the great (= main) Limestone and Glacial deposits. Erratics from Eden Valley, Lake District, and S.W. of Scotland abound.

Return by Brakes to Middleton-in-Teesdale.

During the week-end an opportunity will be afforded of visiting the Whin quarries at Parkend, where the pencil bed can be seen in relation to the Whin Sill.

PERMISSION to visit their properties has been kindly granted by Lord Barnard, the Earl of Strathmore, Messrs. Ord and Maddison, George Hodsman, Esq., and the Tees Valley Water Board.

GEOLOGY.—The Geological Section will be officially represented by Mr. Cosmo Johns, F.G.S. who writes :—Lower Carboniferous, from the Jew (Hardra), Limestones up to the base of the Millstone Grit are exposed together with the Great Whin Sill, an intrusive mass of dolerite the metamorphic effects of which on the Limestones and Shales provides some of the most interesting features of the district. Both at High Force and Cauldron Snout fine exposures of the Dolerite may be seen. At the foot of Cronkley Fell on the Western side of the Burtreeford fault there is an exposure of finely cleaved Skiddaw Slates, highly contorted and intersected by mica trap dykes. Higher up the valley, rocks of the Borrowdale series occur, and fragments are found in the drift, though the beds themselves are not visible now.

The area has been intensely glaciated, moraines abound, and overflow channels are common in Limedale.

Mr. J. J. Burton, F.G.S., writes :—The physical features of the district to be investigated are of the highest interest. The Tees rises on Cross Fell, and after flowing over bleak moorlands spreads out into a wide sluggish sheet of water known as the "wheal." From that point it becomes a rapid, turbulent stream for many miles. The remarkable cascades of Cauldron Snout give a fall of 200 feet over columnar basaltic steps, and five miles further down the stream the river is precipitated 69 feet in one fall over the basaltic lip of High Force. At High Force, in the gorge below the falls, the Limestones and Shales have been so altered by the

intrusion of the basalt that they have assumed a columnar structure like the basalt itself, and may readily be mistaken for a section of the Whin Sill. The river continues its rapid course, and between Cauldron Snout and the junction of the Lune—the most Westerly and Easterly points of investigation—in a distance of 11 miles there is a drop in level of 800 feet. The area marked out is a portion of the eastern flank of the Pennine range, and in the western part occurs the thickest section of the Whin Sill—a dolerite rock generally regarded as intrusive, although there are authorities who contend for a submarine overflow. The beds above and below the sill give the whole series of the Yoredales, many of which the members will have excellent opportunities of examining, and between Lunedale and Teesdale they attain their highest point of elevation. At White Force, on Cronkley Scars, the waterfall is over the Whin, and in wet weather is very picturesque, but its chief attraction to the geologist is the limestone base, which has been altered by contact with the Whin, and is now of saccharoidal character for a thickness of 30 or 40 feet, the whole of which is accessible. The grain is much finer than that found in Widdy Bank.

The whole district is full of mineral veins. Lead has been largely worked. Zinc blend is visible, and Baryta is now worked. There are several very marked faults, one, the Teesdale fault—determining the course of the river for some miles—has a down-throw to the north, and another in Lunedale has a down-throw to the south, leaving an elevated region in between the two. The great Burtreeford Dyke, which extends from Wearhead in Durham to Cronkley Fell, can be seen where it crosses the Tees, and gives excellent opportunities for examining the disturbance of the strata.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will be officially represented.

BIRDS.—Many rare birds frequent Upper Teesdale, for particulars see Mr. James Backhouse's "Upper Teesdale."

Mr. W. Walton, of Middleton, will join the party and give assistance to the ornithologists.

CONCHOLOGY.—The Conchological Section will be officially represented.

BOTANY.—This Section will be officially represented by Dr. W. G. Smith, of Edinburgh.

The district is rich botanically. For particulars see Baker's "North Yorkshire," and the chapter on Teesdale Flora, by Mr. James Backhouse, in "Upper Teesdale."

Mosses and Hepatics.—The Yorkshire Bryological Committee will be officially represented by Mr. W. Ingham, who writes :—This is a very rich district for these plants, and there are numerous interesting records by Spruce and many other botanists, far too many to indicate in this circular.

The following are plants of interest recorded during the last few years, most of them by the writer.

Widdy Bank seems too far from Middleton as a centre, so its many rareties are omitted.

I. **Hepatics**—On Holwick Fell.—*Lophozia Floerkii*, *L. Lyoni*, *L. barbata*, *Aplozia cordifolia*, and *Plagiochila spinulosa*, a large form in fruit (the last in Fairy Dell). At the High Force, *Reboulia hemisphærica*, *Madotheca lævigata*, *M. rivularis*, and *Aplozia cordifolia*. Between Winch Bridge and High Force, *Scapania rosacea*, *S. æquiloba*. At the White Force, *Preissia quadrata*, *Metzgeria pubescens*, *Marsupella Pearsoni*, *M. aquatica*, *Lophozia bantriensis*, *Eucalyx obovata*, and *Plagiochila Dillenii*.

II. **Sphagna.**—The richest ground for these is Cronkley Pastures, between Cronkley Scars and the R. Tees, where most of the British species of Sphagna are to be found. The rarest are :—*S. Girgensohnii* with vars, *commune*, *coryphæum*, *cristatum*, *hydrophilum*, *spectabile*, *stachyodes*, and *xerophilum* ; *S. Russowii* vars. *rhodochroum*, and *virescens* ; *S. Warnstorfii* on Cronkley Fell ; *S. Rubellum* vars. *pallescens*, *purpurascens*, *rubrum*, *versicolor* and *viride* on Cronkley Fell ; and the last var. also in the Pastures ; *S. fuscum* on the Fell ; *S. quinquefarium* vars. *pallescens*, *roseum*, and *virescens* in the Pastures, and v. *fusco-flavum* at the White Force ; *S. teres*, *S. parvifolium*, *S. medium* v. *versicolor* on Cronkley Fell.

III. **True Mosses.**—On Holwick Fell, *Andreæa petrophila* vars., *acuminata* and *homomalla*, *Rhabdoweisia denticulata*, *Campylopus atrovirens*, *Barbula rubella* v. *ruberrima*, *Heterocladium heteropterum*, *Plagiothecium pulchellum* and *Hypnum protensum*.

At the High Force, *Cynodontium Bruntoni*, *Ceratodon conicus*, *Orthotrichum cupulatum*, *O. stramineum*, *O. pulchellum*, *Heterocladium heteropterum*, and *Plagiothecium pulchellum*.

At the White Force, *Andreæa alpina*, *Grimmia torquata*, *Bryum concinnatum* *Dicranum scofarium* var. *spadiceum* and *Plagiothecium pulchellum* In Cronkley Pastures, *Catoscopium nigritum ;* and on the river bank, above the High Force, is *Cynodontium laxirete*.

Fungi.—The Yorkshire Mycological Committee will be officially represented by Mr. Charles Crossland and other members of the Committee. Mr. Crossland writes that little if any mycological work has been done in the immediate neighbourhood.

THE BOTANICAL SURVEY COMMITTEE will be officially represented by Dr. W. G. Smith and Dr. T. W. Woodhead. This excursion affords an opportunity of examining the more important Moorland Plant Associations of the North of England, both Alpine and Sub-Alpine ; and it is hoped that a visit may be made to Shacklesborough Moss, to see the interesting Sphagnum Bogs. Details of these Associations will be found in the paper by Mr. F. J. Lewis, on the "Geographical Distribution of Vegetation in the Basins of the Rivers Eden, Tees, Tyne and Wear," in the "Geographical Journal" for March, 1904.

ENTOMOLOGY.—The Entomological Section will be officially represented by its President, Mr. M. L. Thompson, F.E.S.

COLEOPTERA.—The Yorkshire Coleoptera Committee will be officially epresented.

Mr. M. L. Thompson writes :—Upper Teesdale is a most interesting district for the Coleopterist in search of mountain and sub-alpine beetles. On the moors, in the neighbourhood of Cronkley, *Bradycellus cognatus*, *Calathus micropterus*, *Pterostichus vitreus*, *Bembidium stomoides*, *B. monticola*, *Trechus secalis*, the rare *Lathrobium punctatum (atripalpe)*, *Aphodius fœtidus*, and *A. borealis (putridus)* occur, whilst *Hydroporus tristis*, *H. morio*, *H. gyllenhali* *H. melanarius* *H. obscurus*, and *Ilybius guttiger* inhabit the mossy pools in this locality. If the slopes of Mickle Fell be reached, it is here that the fine *Carabus glabratus* is found, together with *Calathus melanocephalus*, variety *nubigena*, *Patrobus assimilis*, and *Agabus congener*. Other species recorded for Upper Teesdale are : *Bradycellus collaris* (near Bowes), *Corymbites cupreus*, variety *æruginosus* (near Caldron Snout), *Ancistronycha abdominalis* (Harris and Blatch), and a fine green variety of *Chrysomela varians* (near Caldron Snout—W. C. Hey).

ARACHNOLOGY.—The Yorkshire Arachnida Committee will be represented by Mr. W. Falconer (President).

Mr. Falconer writes :—May is a good month for spiders, and granted fine weather there is every prospect of successful results being obtained. The Rev. J. E. Hull in his "Catalogue of the Spiders of Northumberland and Durham," Trans. N.D., and Newcastle-upon-Tyne, Vol. XIII., part 1, records close on 40 species of Spiders from the Durham side of the Tees, nearly all of which are definitely stated to have occurred in Upper Teesdale. With one or two exceptions probably from Lower Teesdale, they are common species and should all be met with, together with many others, on the Yorkshire side, which has hitherto been entirely free from the attention of arachnologists.

PROGRAMME OF MEETINGS (Monday) :

4-20 p.m. prompt—Meat Tea, 1/6 each.
4-45 p.m.—Sectional Meetings.
5-0 p.m.—General Meeting.
} Bus leaves at 5-25 p.m. for Station.

Train for all parts leaves 5-38 p.m.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before May 24th to the Secretary of the Y.N.U., the Museum, Hull.

Yorkshire Naturalists' Union.

President:
Prof. A. C. SEWARD, M.A., F.R.S., etc.

Divisional Secretary:
RILEY FORTUNE, F.Z.S., 5, Grosvenor Terrace, East Parade, Harrogate.

Hon. Secretary:
T. SHEPPARD, F.G.S., Municipal Museum, Hull.

THE 223RD MEETING

WILL BE HELD AT

MALHAM,

ON

Saturday, June 4th, 1910.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland and N.E. Railways, which have booking arrangements for Bell Busk, to Members and Associates of the Y.N.U., surrendering the Certificate noted below. Tickets taken on Friday, June 3rd, will be available for return on Monday, June 6th. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by the Secretary of the Union. Members and Associates wishing for this Certificate must apply to Mr. Sheppard for it. At Stations on the N.E. Rly. tickets at the reduced fares will be issued on production of the signed card of membership.

RAILWAY ARRANGEMENTS, etc.—Station—Bell Busk (Midland). Malham is 4½ miles away. Conveyances will meet the train arriving at 9-46 and 11-30. Return fare 1/9. In order to secure seats it will be necessary for those desiring them to communicate with the Divisional Secretary, stating which train they will arrive by, otherwise they cannot be guaranteed.

BOOKS AND MAPS.—The whole area is included in Sheet 60 (or 92 N.W. of old series) of the One-Inch Ordnance Map, which may be obtained geologically coloured.

For Geological information see Phillips' "Geology of Yorkshire," vol. 2, and his "Rivers, Mountains, and Sea Coast." See also Davis and Lees' "West Yorkshire," "The Handbook of the Leeds Meeting of the British Association," etc.

HEADQUARTERS.—The Buck Hotel. For those desiring to stay the week-end the terms are 7/- per day for bed, breakfast, sandwiches and dinner. Other accommodation may be obtained. There is also a good hotel at Kirby Malham, a mile nearer the railway station.

EVENING MEETING on the Saturday evening.

PERMISSION to visit his estates has been granted by W. Morrison, Esq.

GEOLOGY.—The Geological Section will be officially represented by Mr. Cosmo Johns, F.G.S.

Mr. Johns writes:—As a fuller account of the Geology with map, of the district to be visited, will appear in the June number of the "Naturalist," a somewhat brief notice will suffice here. In no area along the line of the Craven Faults can the full extent and significance of the two great fractures known as the Inner and Outer Faults be better observed than near Malham. The faults themselves are revealed by the magnificent fault scarps, which contribute in so marked a manner to the striking scenery of the district. Perhaps still more striking to the geologist is the marked lithological differences in the Carboniferous Limestone Series as traced from the easily recognised Great Scar Limestone and Yoredales of

Penyghent, north of the faults, through the debased Yoredales of Block Hill, between the faults, to the fractured and folded sections that crop out between the heavy blanket of drift in the picturesque Craven Lowland country, immediately south of the Outer Fault. Here and there along the northern margin of the Inner Fault, are exposures of more ancient rocks whose high dip and marked cleavage are in striking contrast to the practically horizontal Carboniferous Basement Beds which lie with such pronounced unconformity upon them.

An informal meeting of the Geological Section will be held after dinner, on the Saturday meeting. A special programme of excursions will be suggested for those able to stay over the week end.

BOTANY.—The Botanical Section will be officially represented by Mr. F. Haxby.

Flowering Plants.—Mr. J. Beanland writes:—The West Riding of Yorkshire has no centre to equal Malham from a botanical standpoint (Phanerogamic). This assertion is justified by merely making a list of the plants that will be met with, the majority of which I saw in June, 1908:—*Thalictrum minus*, or its vars, *Trollius europæus*. *Aquilegia vulgaris*, *Actæa spicata*, *Meconopsis cambrica*, *Arabis hirsuta*, *Draba muralis*, *Draba incana*, *Cochlearia alpina*, *Thlaspi alpestre* var. *occitanum*, *Hutchinsea petræa*, *Viola hirta*, *Viola lutea*, *Polygala amara* (*amarella*, Krantz,) *Arenaria verna*, *Geranium sanguineum*, *Geranium lucidum*, *Hippocrepis comosa*, *Vicia sylvatica*, *Rubus Chamæmorus* (in thousands on Fountain's Fell, in full flower), *Rubus saxatilis*, *Potentilla alpestris* (*Crantzii*, Beck,) *Saxifraga granulata*, *Saxifraga hypnoides*, *Saxifraga umbrosa* (is well established on Gordale Beck, an escape from a farmhouse), *Ribes rubrum* var. *petræum*, *Sedum Telephium*, *Sedum villosum*, *Hippuris vulgaris*, *Antennaria dioica*, *Primula farinosa*, *Polemonium cæruleum*, *Bartsia alpina*, *Orchis incarnata*, *Polygonatum officinale*, *Convallaria majalis* *Allium oleraceum* var. *complanatum*, *Paris Quadrifolia*, *Potamogeton lucens*, *Scirpus Caricis*.

Mosses and Hepatics.—The Yorkshire Bryological Committee will be officially represented by Mr. F. Haxby.

Mr. Haxby writes:—Malham district is very rich in mosses; the following are a few of the most interesting:—*Polytrichum alpinum*, *Polytrichum gracile*, *Ditrichum flexicaule*, var. *densum*, *Seligeria pusilla*, *Dicranodontium longirostre* var. *alpinum*, *Fissidens crassipes*, *Hedwigia ciliata*, *Barbula recurvifolia*, *Barbula spadicea*, *Barbula unguiculata*, var. *cuspidata*, *Weisia tortilis*, *Trichostomum crispulum*, *Encalypta vulgaris*, *Zygodon viridissimus*, *Zygodon gracilis*, *Orthotrichum Lyellii*, *Orthotrichum affine*, *Orthotrichum tenellum*, *Splachnum ampullaceum*, *Splachnum sphæricum*, *Funaria calcarea*, *Amblyodon dealbatus*, *Bartramia ithyphylla*, *Webera polymorpha*, *Webera cruda*, *Bryum murale* *Bryum roseum*, *Mnium orthorrhynchum*, *Mnium subglobosum*, *Cinclidium stygium*, *Fontinalis antipyretica* var. *gigantea*, *Fontinalis antipyretica* var. *gracilis*, *Pseudoleskea catenulata*, *Orthothecium rufescens*, *Brachythecium glareosum*, *Hypnum Wilsoni*, *Hypnum scorpoides*, *Hypnum stramineum*, *Hypnum giganteum*, *Hylocomium rugosum*.

Algæ and Lichens.—Mr. Wm. West writes:—Many interesting Algæ occur, among which are:—*Soytonema myochrous*, *S alatum*, *Rivularia haematites*, *Nostoc muscorum*, *N microscopicum*, *Plectonema Tomasinianum*, *Oscillatoria princeps*, *Chroococcus limneticus*, *Merismopedia elegans*, *Ceratium hirundinella*, *Volvox aurens*, *Gonatozygon monotænium*, *Sphærocystis Schræteri*, *Staurastrum manfeldtii*, *S. furcigerum*, and scores of other good species.

Lichens are well represented, among them are the following:—*Endocarpon rufescens*, *E. miniatum*, *Verrucaria plumbea*, *V. rugulosa*, *V. thelostoma*, *V. myriocarpa*, *V. mutabilis*, *V. canella*, *Arthonia astroidea*, *Graphis scripta*, *Lecidea excentrica*, *L. cyrtella*, *L. subnigrata*. *L. lurida*, *L. ochracea*, *Amphiloma lanuginosum*, *Parmelia Borreri*, *P. subaurifera*, *P. fuliginosa*, *Physcia cæsia*, *Leptogium turgidum*, *L. fluviatile*, and many others.

Fungi.—

Mr. C. Crossland, F.L.S., writes:—At the Y.N.U. Meeting held there, September 1st, 1883, Mr. Soppitt reported about "50 species been seen during the day," and added that "the district was peculiarly rich in epiphyllous species." Unfortunately, however, out of the 50 seen, seven only were mentioned in the report. When compiling the Yorks. Fungus Flora it was felt that the remaining 43 might as well never have been seen. A good many of the leaf fungal-parasites should be out on the date of the excursion.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will be officially represented by Messrs. Booth, Fortune and Parkin.

Mammalia.—Mr. H. B. Booth writes:—This district contains the ordinary common Yorkshire wild mammals. The Water Shrew occurs along the infant river, and has been reported from the Tarn. Very little is known about the Bats.

I have taken the Long-eared Bat at Airton, and Bats are usually to be seen flying at Malham village on the road to the Cove. They are usually supposed to be Pipistrelles, but it would be well if one could be definitely identified.

Birds.—Mr. H. B. Booth writes:—The district is a good one for the ornithologist. At this season of the year, the Curlew, Redshank, Golden Plover, Lapwing, Snipe, Dunlin, Red Grouse, Partridge, Ring Ouzel and Wheatear should all be seen on the moors. The Tufted Duck, Mallard, Teal, Coot, Waterhen, and Little Grebe, nest at the Tarn; and possibly also the Water Rail and Pochard, both of which occur there in winter. During the nesting season of 1909 some Ringed Plovers were seen on two occasions by Mr. W. H. Parkin, but no proof could be obtained of their having bred there. By the stream sides the Dipper, Grey and Yellow Wagtails and Sandpipers regularly nest. The Grasshopper Warbler and Lesser Whitethroat usually occur near the village. In the plantations and woods on the hillsides the Long-eared Owl and Carrion Crow nest comparatively commonly. At Malham Cove and Gordale Scar, Kestrels, Stock Doves and numerous Jackdaws nest; and the Raven and Peregrine Falcon pay occasional visits. Many other more commonly distributed species will be found, such as the Redstart, Spotted Flycatcher, Tree Creeper, Tree Pipit, Wood and Willow Warblers, etc., which in the woods above the Tarn, occur at the highest altitude of their range in Yorkshire (about 1350 feet).

Fish.—The Trout in Malham Tarn attain to a good size, and a small percentage of them are subject to a slight malformation of the gills, which is believed to be caused through their long isolation and in-breeding; and from the same supposed reason a few of the fine Perch which the Tarn contains become blind. The Minnow, Loach, Stickleback and Bullhead are reported to occur in the Tarn.

Meetings.—Informal meetings of this Section will be held in the evenings. As many members as possible are urged to stay over the week-end.

CONCHOLOGY.—The Conchological Section will be officially represented by its President, Mr. J. F. Musham.

Land and Freshwater Mollusca.—Mr. F. Booth writes:—Malham, to conchologists, is a very productive district, yielding in abundance, under favourable conditions, such species as *Pyramidula rupestris*, *Helicigona arbustorum*, *Balea perversa*, *Clausilia bidentata*, *C. cravenensis*, *etc.*

At the base of the Cove many interesting species and varieties are to be found, viz. :—*Hyalinia alliaria* and var. *viridula*, *Hy. cellaria* vars. *complanata* and *margaritacea*, *Hy. helvetica* and var. *umbilicata*, *Pyramidula rotundata* var. *alba*, *etc.* Other species occurring there are *Vitrina pellucida*, *Hyalinia nitidula*, *Hy. pura*, *Hy. fulva*, *Hy. crystallina*, *Helix nemoralis*, *H. hortensis*, *Helicigona arbustorum*, *Hygromia rufescens* and *hispida*, *Azeca tridens*, *Ena obscura*, *Clausilia laminata*, *Pupa umbilicata*, *etc.*; whilst in the River Aire the type and white variety of *Ancylus fluviatilis* occurs along with the ubiquitous *Limnæa peregra*. *Pupa muscorum* is recorded for this district, and it would be most interesting to verify this record.

Many of the road-sides yield the larger Helices in abundance, whilst the tops of the walls are an excellent hunting ground for *Pyramidula rupestris*, *Balea perversa*, *Clausilia bidentata*, *etc.* *Helicella itala* occurs on several sloping fields and bank sides, both approaching the cove and on the way to Gordale Scar. In the vicinity of the Scar *Helicigona lapicida* and *Pupa secale* may be found by searching the rock crevices.

Vertigo pygmaea and *V. pusilla* occur in the wooded ravine near Janet's Cave, and are also occasionally found at the Cove.

A small marsh near the Tarn furnishes a few species, viz. :—*Vertigo antivertigo*, *Succinea elegans*, *Planorbis spirorbis*, *Limnæa truncatula*, and three species of *Pisidia*. The Tarn itself, although over a 1000 feet altitude, is very productive in freshwater Mollusca, and the following species have been collected in this upland sheet of water :—*Planorbis albus*, *P. nautileus*, *P. contortus*, *Limnæa peregra*, *L. palustris*, *L. truncatula*, *L. stagnalis* var. *fragilis*, *Physa fontinalis*, *Bythinia tentaculata*, *Valvata piscinalis*, *Sphærium corneum*, *Pisidium pusillum*, *etc.*

Several of the more common slugs have been found throughout the district, the most interesting being *Limax arborum*, *Arion intermedia*, and *Agriolimax lævis*.

ENTOMOLOGY.—The Entomological Section will be officially represented by its President, Mr. M. L. Thompson, F.E.S.

Mr. J. W. Carter, F.E.S., writes;—The insect fauna of Malham and district is very imperfectly known, the only knowledge we possess being the results of merely flying visits, so that it is hoped that entomologists will take note of all species seen in the various orders.

Lepidoptera.—Mr. Carter writes:—The following are all the species which have so far been recorded:—*Larentia ruficinctata* (added to the Yorkshire list from this locality), *Pieris napi*, *Chortobius pamphilus*, *Nudaria mundana*

(abundant) *Venilia maculata*, *Larentia multistrigaria*, *L. salicata*, *L. pectinitaria*, *Coremia munitata*, *C. propugnata*, *Cosmia trapezina*, *Hadena thalassina*, *Abrostola urticæ*, *Pyrausta purpuralis*, *Herbula cæspitalis*, and *Sciaphila pasiuana*.

Coleoptera.—The Yorkshire Coleoptera Committee will be officially represented by Mr J. W. Carter, F.E.S.

Mr. Carter writes :—About 70 species of Coleoptera have been recorded for the district, including amongst them *Cychrus rostratus*, *Nebria gyllenhalii*, *Badister bipustulatus*, *Oxytelus laqueatus*, *Choleva nigricans*, *C. tristis*, *C. watsoni*, *Hister succicola*, *Epurœa melina*, *Sinodendron cylindricum*, *Aphodius fossor*, *A. depressus*, *Corymbites cupreus* and its var. *æruginosus*, *Campylus linearis*, *Ancistronycha abdominalis*, *Telephorus pellucidus*, *T. nigricans* and its var. *discoideus*, *Chrysomela polita*, *C. fastuosa*, *Phytodecta pallida* (some interesting varietal forms nearly black), *Hydrothassa aucta*, *Psylliodes napi*, *Cistela murina*, *Otiorhynchus ovatus*, *Phyllobius calcaratus*, *Barynotus obscurus*, and *Tropiphorus tomentosus*.

Diptera.—Mr. J. H. Ashworth writes :—The following species were taken by Messrs. Carter and Stringer in May and June, 1909. The Bibionidæ taken include *Dilophus febrilis* and *Bibio laniger*; Tipulidæ being represented by *Tipula gigantea*, and Limnobidæ by *Limnobia flavipes* and *L. tripunctata*. *Thereva nobilata* has been found, whilst the "Downlooker" or Oak fly (*Leptis scolopacea*) will be common, resting head downwards on tree trunks.

The Empidæ or Snipe-flies will probably be in full force, and besides the common species *Rhamphomyia sulcata*, *Empis tessellata*, *E. stercorea*, and *E. trigramma*, *E. bilineata* has been found.

Besides the common species of *Platychirus*, the Syrphidæ or Dart-flies will probably be represented by *Chilosia intonsa*, and *C. albitarsis* has been taken along with *Helophilus pendulus*. *Scatophaga suilla* was amongst the yellow Dung-flies and the Acalypteræ on record for the district also include *Sciomyza albocostata* and *Palloptera trimacula*.

At this time of the year the Muscidæ will be represented by the Greenbottle and Bluebottle flies (*Lucilia cæsar*, *Euphoria cornicina*, *Calliphora erythrocephala* and *C. vomitoria*), but though the only species of Anthomyidæ mentioned is *Hydrophoria conica*, others will doubtless be found.

CRUSTACEA.—

Isopoda.—Mr. T. Stringer writes :—The following species were found whilst collecting Coleoptera :—*Trichoniscus roseus*, Koch. *Oniscus asellus*, Linn. (Well deserves the name of "Common Slater," being abundant everywhere. The young of this species are very variable in colour, and are often mistaken for the adult of other genera). *Porcellio scaber*, Latreille (not so numerous as the preceding species, but well distributed in the district). *Porcellio pictus*, Brandt (only one locality was noticed, viz., opposite the village "smithy"). *Armadillidium vulgare*, Latreille (not common, but well distributed). If the district were properly worked, no doubt the following would be found :—*Trichoniscus pusillus*, Brandt, *Philoscia muscorum*, Scopoli, *Platyarthrus hoffmannseggii*, Brandt, *Cylisticus convexus*, De Geer, and some others of the *Armadillidia*.

ARACHNOLOGY.—The Yorkshire Arachnida Committee will be represented.

Mr. W. P. Winter, writes :—The following Spiders and Harvestmen have been recorded from Malham and the immediate neighbourhood.

Spiders.—*Segestria senoculata*, Linn. *Cryphœca silvicola*, C.L.K. *Cœlotes terrestris*, Wid. *Hahnia montana*, Bl. *Theridion pallens*, Bl. *Phyllonethis lineata*, Clerck. *Robertus lividus*, Bl. *Linyphia peltata*, Wid. *Leptyphantes Blackwallii*, Kulcz. *Bathyphantes variegatus*, Bl. *B. concolor*, Wid. *Erigone dentipalpis*, Wid. *Enidia bituberculata*, Wid. *Zilla X-notata*, Clerck. *Epeira diademata*, Clerck. *Xysticus cristatus*, Clerck. *Trochosa terricola*, Thor. *Lycosa amentata*, Clerck. *L. monticola*, C. L. Koch.

Harvestmen.—*Megabunus insignis*, Meade. *Nemastoma lugubre*, O.F.M. *Oligolophus morio*, Fabr. *Platybunus corniger*, Herm.

PROGRAMME OF MEETINGS :—

4-30 p.m —Tea, 1/9 per head
5-30 p.m.—Sectional Meetings } All at the Buck Hotel.
5-45 p.m.—General Meeting }
6-20 p.m.—Conveyances leave for Malham.
5-54 and 8-39 p.m.—Train leaves for Bradford and Leeds.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before June 20th to the Secretary of the Y.N.U., the Museum, Hull.

CIRCULAR 224.]

Yorkshire Naturalists' Union.

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Divisional Secretary:
J. W. STATHER, F.G.S., Brookside, Newland Park, Hull.

Hon. Secretary:
T. SHEPPARD, F.G.S., Municipal Museum, Hull.

THE 224TH MEETING

WILL BE HELD AT

SPURN,

ON

SATURDAY, JULY 9th, 1910.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland and N.E. Railways, which have booking arrangements for WITHERNSEA, to Members and Associates of the Y.N.U., surrendering the Certificate noted below. Tickets taken on Friday, July 8th, will be available for return on Monday, July 11th. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by the Secretary of the Union. Members and Associates wishing for this Certificate must apply to Mr. Sheppard for it.

NORTH EASTERN RAILWAY.—Cheap week-end tickets are issued to Withernsea from all North Eastern stations and from the principal stations on other companies' lines, on Fridays and Saturdays, available for return on Sunday, Monday, or Tuesday. On the North Eastern line, cheap Saturday tickets can also be obtained by members desiring to go and return the same day. The fares for both these descriptions of ticket are about a single fare for the double journey.

CONVEYANCES, etc.—Station—Withernsea (North Eastern Railway). Easington is 8 miles away. On Saturday morning, conveyances will meet the trains arriving as below, unless otherwise arranged. In order to secure seats it will be necessary for those desiring them to communicate with the Divisional Secretary, stating which train they will arrive by, otherwise they cannot be guaranteed. At the station members should ask for Mr. Tom Pygas.

TRAIN AND CONVEYANCE TIMES.

Trains leave Hull.	Arrive at Withernsea.	Conveyances leave Withernsea.	Arrive at Kilnsea.
9 37 a.m.	10 34 a.m.	10 40 a.m.	12 10 p.m.
12 2 p.m.	12 58 p.m.	1 0 p.m.	2 30 p.m.
1 8 p.m.	1 45 p.m.	2 0 p.m.	3 30 p.m.

Conveyances leave Kilnsea.	Arrive at Withernsea.	Trains leave Withernsea for Hull.	Arrive at Hull.
4 0 p.m.	5 30 p.m.	5 40 p.m.	6 30 p.m.
5 0 p.m.	6 30 p.m.	6 38 p.m.	7 35 p.m.
		7 41 p.m.	8 28 p.m.
6 30 p.m.	8 0 p.m.	8 10 p.m.	8 52 p.m.
		8 21 p.m.	9 16 p.m.
		10 21 p.m.	11 15 p.m.

The cost of the Return Fare from Withernsea to Kilnsea by waggonette is 1/6. The conveyances will meet the trains in at the station.

TRAINS LEAVE HULL FOR

Leeds and Bradford, 8-40 p.m.
Darlington and York, 8-40, 11-25 p.m.
Selby, 8-0, 8-30, 8 40, 11-25 p.m.
Halifax, 7-30 p.m.
Sheffield (Cannon Street), 7-0 p.m.; (Paragon), 9-20 p.m.
Doncaster, 9-20, 11-25 p m.

BOOKS AND MAPS.—The whole area is included in Sheet 85 (of old series) of the One-Inch Ordnance Map, which may be obtained geologically coloured.

For information concerning the geology, and fauna and flora of the district, see Phillips' "Geology of Yorkshire," vol. 1, and his "Rivers, Mountains, and Sea Coast,"; Reid's "Geology of Holderness"; Sheppard's "Geological Rambles in East Yorkshire"; and "Coast Changes in East Yorkshire" (Royal Geographical Society, June, 1909); Nelson's "Birds of Yorkshire"; Clarke and Roebuck's "Vertebrate Fauna of Yorkshire"; Robinson's "Flora of the East Riding"; Petch's "Marine Fauna of the Humber District", "Land and Fresh-water Mollusca of the East Riding," "Notes on the Reclaimed Land of the Humber District," and other papers in the Transactions of the Hull Scientific Club; Porritt's "List of Yorkshire Lepidoptera," Browne's "Catalogue of the Dobree Collection" (Hull Museum Publication, No. 63); Stainforth's "List of East Yorkshire Spiders, etc," (Hull Museum Publication, No. 59); Y.N.U. circulars No. 140 (July 30th, 1898), and No. 180 (July 4th, 1904); and the account of the 1904 meeting, in "The Naturalist" for August, 1904.

THE DISTRICT to be investigated includes the peninsula of Spurn, and the sea coast and Humber shore in the immediate vicinity of Kilnsea and Easington.

Mr. Sheppard writes :—The various capes and bays and other irregularities on the Yorkshire coast can, with one exception, all be explained by the theory of the survival of the fittest. Flamborough Head, Filey Brig, etc., are hard masses of rock that have been left behind by the waves, whilst the softer material on each side has been denuded. The exception to this rule is Spurn point. This, instead of being a hard rocky promontory, as might be inferred from its shape as shown on the map, is a low-lying bank made of sand and shingle, which for its stability largely depends upon the roots of the marram grass, and groynes and other artificial methods of protection.

Spurn point owes its existence to the material washed down the Yorkshire coast, which falls on meeting the waters of the Humber. The southerly and easterly directions of the waters of the North Sea and the Humber respectively, define the shape of Spurn. Year by year the point extends southwards and westwards. The rate of growing can be ascertained by reference to plans, as well as, in recent times only, by actual measurement.

There is no doubt that a time will come when the flow of the Humber waters will prevent the further southerly extension of the peninsula; or if the growth towards the Lincolnshire shore continues, a break must occur in the present sand-bank. As it is, it is fairly clear that under favourable conditions, pebbles, etc., are carried across the estuary to Lincolnshire. No doubt such changes have frequently taken place; on more than one old chart an island is shown where the peninsula now is. And is it not possible that the old town of Ravenser, which existed on an island at the Humber mouth, but which was gradually washed away, may have had its foundations on a portion of Spurn point at one of these critical periods of its career?

HEADQUARTERS.—Marquis of Granby Hotel, Easington.

Accommodation.—For those desiring to stay the week-end the terms are 6/- per day for bed, breakfast, sandwiches and dinner. Other accommodation may be obtained.

Applications for accommodation should be made to Mr. J. Benson, Marquis of Granby Hotel, Easington, E. Yorks., nor later than July 7th. The beds will be allocated strictly in the order of written applications.

EVENING MEETING on the Saturday evening.

A Special Meeting of the Boulder Committee will be held on Saturday, when Mr. J. W. Stather, F.G.S., will exhibit a number of erratic boulders from Denmark. It is hoped to recognise some of these amongst the boulders on the beach in the Spurn neighbourhood.

ROUTES :—On Saturday, the Kilnsea and Spurn areas will be visited. On the following day, investigations will be conducted along the Humber shore towards Skeffling.

PERMISSION to visit his property has been kindly granted by Major Chichester Constable.

LOW TIDES :—At 1 p.m. Saturday; 1-40 p.m. Sunday; 2-30 p.m. Monday.

BIRD PROTECTION :—It is satisfactory to know that the Spurn district is an absolutely protected area, within which no birds may be shot nor any nests or eggs taken, and the Union has a watcher on the headland.

GEOLOGY.—The Geological Section will be officially represented by Mr. J. W. Stather, F.G.S., and Mr. T. Sheppaad, F.G.S.

Mr. T. Sheppard writes :—In addition to the physiographical features referred to in the paragraph under the head of "The District," the south-east corner of Yorkshire has many attractions to the geologist. The cliffs are being denuded at

an average rate of seven feet per annum, and this means that a constantly changing section presents itself. With the exception of small post-glacial lacustrine deposits, which occur in hollows in the Boulder Clay, the whole area consists of glacial debris. At Dimlington, where the cliffs are over 150 feet high, there is a magnificent series. In the lower part of the cliff, and on the beach, are exposures of the Basement Boulder Clay, the oldest of the glacial beds. This is a lead-coloured deposit, containing large numbers of transported marine shells of an Arctic type (generally broken); and a good proportion of Scandinavian erratics, Above it is the Middle or Purple Boulder Clay, with the Teesdale and Lake District rocks, usually striated, and also containing numerous Liassic and Cretaceous fossils which are different from those occurring *in situ* in Yorkshire. They have probably been derived from outcrops in the bed of the North Sea. The Upper or Hessle Clay is of a loose texture, and a foxy-red colour. Its contained erratics are few and small, but contain a very large proportion of Cheviot and Scottish rocks At Dimlington is the best section of Boulder Clay in Yorkshire, and on the beach hereabouts is the greatest variety of rock species to be found anywhere in the British Isles.

BOTANY.—The Botanical Section will be officially represented by Mr. J. F. Robinson.

Flowering Plants—Mr. J. F. Robinson writes :—The known flora of Spurn and Kilnsea with their sea and estuarine coasts, contains, amongst many others, the following, all of which have been recorded in "The Flora of the East Riding of Yorkshire" :—*Cakile maritima*, *Erodium moschatum*, *T. scabrum*, *Vicia lathyroides*, *Rosa rubiginosa*, *Eryngium maritimum*, *Apium graveolens*, *Artemisia maritima*, *Statice Limonium*, *Blackstonia (Chlora) perfoliata*, *Volvulus Soldanella*, *Cuscuta epithymum*, *Atriplex portulacoides*, *Salicornia herbacea*, *Suæda maritima* (the last three on the Humber shore), *Hippophae rhamnoides* (the "dune-thorn" and chief shrub at Spurn), *Ophrys apifera* (the Warren), *Ruppia rostellata* and *Zostera marina* in tidal pools, *Phleum arenarium*, *Ammophila arundinacea*, *Agropyrum junceum*, and *Elymus arenarius*, the last four, all grasses, help very materially to bind the sand together. The following should be sought for :—*Thalictrum collinum*, *Glaucium flavum*, *Cochlearia danica*, *Crambe maritima*, *Astragalus danicus*, *Juncus compressus*, *J. balticus*, *Ammophila baltica*, etc., all of which have places in the British Flora, but not all, as yet, in that of the East Riding.

Mosses and Hepatics—The Yorkshire Bryological Committee will be officially represented.

Mr. J. J. Marshall writes :—Very little information regarding the bryology of the district to be investigated is available. At the 1898 meeting at Withernsea and Spurn, *Tortula ruralis* var. *arenicola* and *Bryum atropurpureum* with *Tortula papillosa*, and *Orthotrichum affine* were gathered. A sharp look-out for the rare *Bryum* which grows on Coatham Marshes and in various estuaries on the east coast, should be kept.

Marine Algæ.—Mr. T. Petch, B.A., B.Sc., records *Corallina officinalis*, *Chondrus crispus*, *Porphyra vulgaris*, *Ulva latissima*, and several others as growing on the Den, and *Cladophora* sp. in the *Zostera* pools.

Amongst the rejectamenta have been found the commoner *Fuci*, including *Halidrys siliquosa*, and the red forms *Delesseria atata*, *D. sinuata*, *Rhodymenia ciliata*, *Griffithsia setacea*, *Plocamium coccineum*, *Polysiphonia fastigiata*, *P. nigrescens*, etc.

Diatoms.—Mr. R. H. Philip writes :—Some good gatherings should be made from the algæ in shore pools on the Humber side of the peninsula. I have found here *Actinocyclus Roperii*, *Actinoptychus undulatus*, *Biddulphia aurita*, *B. turgida*, *Grammatophora oceanica*, *Melosira sulcata*, *Navicula Bombus*, *N. didyma*, *N. humerosa*, *N. littoralis*, *Pleurosigma Balticum*, *Raphoneis amphiceros*, *Surirella gemma*, etc.

Fungi—The Yorkshire Mycological Committee will be officially represented.

Mr. Crossland will be glad to examine any specimens sent to him from the Spurn area.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will be officially represented by Mr. E. W. Wade, M.B.O.U.

Mammalia.—Fox, Hare, Rabbit, Stoat, Weasel, Brown Rat, Water Vole, Mole, Mouse, Common Shrew, and Hedgehog.

Reptiles and Amphibia.—Lizard, Grass Snake, Triton and Smooth Newts.

Birds.—Mr. E. W. Wade, M.B.O.U., writes :—At this time of year, the Spurn promontory contains a very limited avifauna, but none the less interesting from its distinctive character, one that is all its own as far as Yorkshire is concerned. Among the Elder bushes and Sea-Buckthorn Scrub the blackbird is found breeding, and one of the most interesting sights of the place is the debris of shells of *Helix aspersa*, round some stone where this bird or the thrush has hammered them to pieces to get at the contents. A solitary Pied Wagtail or Swallow may be seen, Meadow Pipits and Brown Linnets are abundant everywhere, the latter beginning already to pack into flocks. The ubiquitous Sparrow will be found where there are houses. A stray common Bunting may be heard trilling monotonously on the telegraph wires. Skylarks are everywhere. Flocks of Starlings relieved from their parental duties and not occupied in feeding, are among the bents. A few pair of Shelduck occur, the bird showing very little increase in numbers of late years. Amongst others are an odd Partridge, whose mate is incubating her eggs somewhere near; the Oyster Catcher, which have returned to breed again; four Arctic or Common Terns, these birds having haunted the place for three seasons without breeding; and most important of all, Little Tern and Ringed Plover, which the protection committee has had under its special care, and which show in satisfactory numbers again owing to that protection only, for without it, in a district so largely frequented as this is, they must quickly disappear. A few Gulls, mostly Herring Gull, flapping lazily along the coast, occasionally mobbed by Terns, complete the meagre list. Spurn must be visited in migration time for the bird-lover to see the species that have made it famous.

MARINE ZOOLOGY.—Naturalists interested in this subject may profitably examine the pools on the shore near the beacon, and the Zostera pools on the clays, both being accessible at all tides. The skerries between Kilnsea and Easington, and the Den, should be visited if conditions permit. For walking on the "clays" it is advisable to wear sand-shoes. Mr. T. Petch, B.A,, B.Sc., records the zoophytes *Gonothyræa loveni*, *Obelia gelatinosa*, *Campanularia angulata*, as common on *Zostera*. *Tubularia indivisa* is found on Kilnsea skerries, and *Sagartia nivea* on the Den. Probably the most interesting crustacea are *Macromysis flexuosus*, in pools near Kilnsea beacon, and *Neomysis vulgaris*, common everywhere. Full lists will be found in the Transactions of the Hull Scientific and Field Naturalists' Club, vol. III., and the "Naturalist," January, 1904.

CONCHOLOGY—The Conchological Section will be officially represented.

Land and Freshwater Mollusca—Mr. T. Petch records twenty-one species of terrestrial mollusca for the Point. Of these *Helix nemoralis* is probably the most abundant, in all varieties of banding. An investigation by Mr. Denison Roebuck and others, showed that the majority had interrupted bands, a fact which was attributed to the dryness of the situation, but recent observations have thrown some doubt on the constancy of this feature; (12345) is a common form. *H. caperata* and *H. aspersa* are common, *H. virgata* abounds, and its variety *nigrescens* may be found on ragwort. Minor varieties of *H. nemoralis* and *H. aspersa* have been taken. Old baskets, etc., should be carefully examined, especially if lying on moss or short herbage near the entrance to the warren; under such have been found *Arion minimus*, *Helix pulchella*, *H. pygmæa*, *Hyalinia alliaria*, *Hy. crystallina*, *Hy. fulva*, *Pupa cylindracea*, *P. muscorum*, *Vertigo edentula*, and *V. minutissima*.

Paludestrina ventrosa occurs in brackish ditches and ponds near Kilnsea.

The following marine species have been taken *alive*:—*Paludestrina stagnalis* (on the clays in millions), *Craspedochilus cinereus*, *Limapontia depressa*, (pools near the beacon), *Dendronotus frondosus* (among Tubularia), *Patella vulgata* (on the Den), *Helcion pellucidum*, *Mytilus edulis*, *Scrobicularia plana*, *Tellina tennuis*, *Macoma balthica* var. *caruaria*, *Cardium edule*, *Mya arenaria*, *Barnea candida*, (in clay, Kilnsea skerries), *Gibbula cineraria*, *Littorina littorea*, *L. rudis*, *Buccinum undatum*, and *Purpura lapillus*.

ENTOMOLOGY.—The Entomological Section will be officially represented.

Lepidoptera.—Mr. G. T. Porritt writes in 1904 (when the date of the excursion was 5 days earlier) :—Spurn is a very good entomological locality, as a reference to the "List of Yorkshire Lepidoptera" will show. The date of the excursion is, however, a little too early for many of its characteristic species, but among those which ought to be obtained are *Chærocampa porcellus*, *Orgyia fascelina*, *Leucania littoralis*, *Mamestra albicolon*, *Agrotis corticea*, and *A. ripæ*, which are all common there. Other species which are mostly abundant later, and which might possibly at the date of the excursion be found, or raked up as larvæ or pupæ, include *Tapinostola elymi*, *Agrotis valligera*, *A. cursoria*, *A. tritica*, *A. aquilina*, *A. lævida*, and *A. præcox*. Special search should be made at night with a light for the rare *Eupithecia innotata* on *Artemisia*, which, although not yet recorded for Yorkshire, is almost certain to occur at Spurn. It was at Spurn, too, that Mr. W. Eagle Clarke took our only county specimen of *Heliothis peltigera*, and also where the rare *Eupithecia exteusaria* occurred.

Coleoptera :—The Yorkshire Coleoptera Committee will be officially represented by Mr. E. G. Bayford, F.E.S., and Mr. T. Stainforth.

Mr. E. G. Bayford writes :—Kilnsea Warren and the Spurn peninsula together present many attractive features to the Coleopterist. *Nebria livida*, *Amara bifrons*, *Calathus fuscus*, *Trechus obtusus*, *Berosus luridus*, *Saprinus maritimus*, *Ægialia arenaria*, *Phyllopertha horticola*, *Anomala frischii*, and its unicolorous metallic green variety, *Cis fuscatus*, *Sermyla halensis*, *Nacerdes melanura*, and *Cleonus sulcir stris*, are a few of the species that have been met with, some of them in abundance. Somewhat further north, near Withernsea, *Pelobius tardus* has occurred, and is the only *modern* Yorkshire record for this interesting species.

Mr. Stainforth writes that he has obtained the following species at Spurn about the date of the excursion :—*Amara tibialis*, *A. lucida*, *Stenus impressus*, *Heliopathes gibbus*, *Phaleria cadaverina* and *Notoxus monoceros*.

ARACHNOLOGY.—The Yorkshire Arachnida Committee will be represented by Mr. T. Stainforth and Mr. E. A. Parsons.

Mr. Stainforth writes that Spurn is one of the richest districts in the East Riding for Arachnida. Several rare species occur which have not yet, or had not when recorded, been discovered elsewhere in the county, such as *Prosthesima electa*, C. L. Koch., *P. latreillii* C. L. Koch., *Clubiona subtilis* L. Koch., *Protadia subnigra* Camb., *Xysticus erraticus* Bl., *Lophocarenum nemorale* Bl., *Heliophanus flavipes* C. L. Koch, *Hyctia nivoyi* Luc , and *Euophrys aequipes* Camb. Other species taken at Spurn include *Dysdera crocota* C. L. Koch, *Drassus lapidosus* Walck, *D. troglodytes* C. L. Koch, *Micaria pulicaria* Sund., *Clubiona grisea* L Koch, *C. lutesoens* Westr., *C. neglecta* Camb., *C. holosericea* De Geer, *Agroeca proxima* Camb., *Amaurobius ferox* Walck., *A. similis* Bl., *Robertus lividus* Bl., *Pholcomma gibbum* Westr., *Stemonyphantes lineata* Linn., *Linyphia montana* Clerck, *Leptyphantes tenuis* Bl., *L. ericaea* Bl., *Bathyphantes variegatus* Bl., *Tmeticus concinnus* Thor., *Maso sundevallii* Westr., *Gongylidium apicatum* Bl., *Erigone dentipalpis* Wid., *Enidia bituberculata* Wid., *Dismodicus bifrons* Bl., *Peponocranium ludicrum* Camb., *Pocadicnemis pumilus* Bl., *Prosopotheca monoceros* Wid., *Cornicularia unicornis* Camb., *Pachygnatha degeerii* Sund., *P. clerkii* Sund., *Meta segmentata* Clerck, *Epeira diademata* Clerck, *E. quadrata* Clerck,

E. cornuta Clerck, *Xysticus cristatus* Clerck, *Oxyptila atomaria* Panz, *Philodromus aureolus* Clerck., *P. cespiticolis* Walck., *Tibellus oblongus* Walck , *Trochosa ruricola* De Geer., *T. terricola* Thor., *T. picta* Hahn., *Tarentula pulverulenta* Clerck., *Lycosa amentata* Clerck., *L. pullata* Clerck., and *Euophrys frontalis* Walck. The only Phalangidea recorded are *Phalangium opilio* Linn., *Oligolophus morio* Fabr., *O. agrestis* Meade., and *Nemastoma lugubre* O. F. Muller.

The Pseudoscorpion *Chelifer latreillii* Leach., is very common under pieces of drift wood, etc., and *Chthonius rayi* L. Koch, has been found.

The Humber shore immediately west of Kilnsea, has been little worked by arachnologists. It is certain, however, to yield some local species. On the foreshore nearer Hull have been found *Cornicularia kochii* Camb., *Lycosa purbeckensis* var., *minor* F.O.P. Camb., *Erigone spinosa* Camb., *Erigone longipalpis* Sund., *Cicurina cinerea* Panz., *Tmeticus concinnus* Thor., *Cnephalocotes curtus* Sim., etc., and the Harvest Spiders, *Liobunum blackwallii* Meade., and *Oligolophus hansenii* Kræpl.

ARCHAEOLOGY.—

Mr. Sheppard writes :—It seems fairly clear that the Romans had a road along the coast from some point on the promontory of Flamborough to Spurn. This supposition is supported by the fact that whillst in the low-lying parts of Holderness exceedingly few Roman remains have been found, coins, pottery, etc., have been found at Kilnsea, Hollym, Withernsea, etc. Through the denudation of the cliffs this road has long since been washed away, the relics found being those which were lost or deposited on its western side. Roman and Roman-British earthenware remains, as well as a large number of silver and bronze coins and other relics, many of which are now exhibited in the Hull Museum, have been obtained at Kilnsea and Easington, though principally on the Humber shore. On the Humber shore, before reaching Easington, are some V-shaped trenches which are crowded with fragments of pottery, oyster shells, bones and other refuse. The distance between the various trenches in the Easington district are considerable, and from the objects found it would appear that a small though not unimportant station existed here. From its geographical position commanding the entrance to the Humber and with an outlook to the sea, we should naturally expect that the Romans would have taken advantage of such a place as Spurn Head. For the history of the Spurn neighbourhood in mediaeval times reference should be made to Boyle's "Lost Towns of the Humber."

PROGRAMME OF MEETINGS :—

5-0 p.m —Tea, 1/6 per head
5.45 p.m.—Sectional Meetings
6-0 p.m.—General Meeting
} at the Marquis of Granby Hotel, Easington.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before July 20th to the Secretary of the Y.N.U., the Museum, Hull.

Yorkshire Naturalists' Union.

THE 225TH MEETING

WILL BE HELD AT

KIRBY MOORSIDE

(For LASTINGHAM, etc.),

ON

BANK HOLIDAY WEEK-END,

JULY 30th, to AUGUST 1st.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland and N.E. Railways, which have booking arrangements for Kirkby Moorside, to Members and Associates of the Y.N.U., surrendering the Certificate noted below. Tickets taken on Friday, July 29th, will be available for return on Tuesday, August 2nd. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by the Secretary of the Union. Members and Associates wishing for this Certificate must apply to Mr. Sheppard for it. At Stations on the N.E. and H. & B. Railways, tickets at the reduced fare will be issued on production of the signed card of membership.

BOOKS AND MAPS.—The whole area is included in Sheet 43 and 53 (96 N.E. and S.E. of old series) of the One-Inch Ordnance Map, which may be obtained geologically coloured. The geology is described in the 'Memoir of the Geological Survey.' (Jurassic Rocks of Yorkshire). Members can also refer to Baker's 'North Yorkshire,' and to Mr. George Frank's 'Guide to Ryedale,' which contains much useful information about this district. Buckland's 'Reliquiæ Diluvianæ' gives full information concerning Kirkdale Cave.

THE DISTRICT to be investigated is one of especial interest from many points of view, and seems not to have received the attention it deserves. The well-known Kirkdale Hyæna Cave, wnich was explored by Buckland, is close by.

HEADQUARTERS.—White Horse Hotel.

Accommodation.—For those desiring to stay the week-end the terms are 6/6 per day for bed, breakfast, sandwiches and dinner.

Applications for accommodation should be made to Mr. J. Elliott, the White Horse Hotel, Kirby Moorside.

AN EVENING MEETING will be held on Saturday, when some notes will be read on Kirkdale Cave.

ROUTES will be arranged and posted up each morning at Headquarters.

GEOLOGY.—The Geological Section will be officially represented.

Mr. W. Lower Carter, M.A., F.G.S., writes that Kirby Moorside is situated in the midst of some of the most characteristic scenery of the famous Vale of

Pickering, which is a roughly oval area almost entirely covered with alluvial deposits and post-glacial sands and gravels. This oval is elongated in an east and west direction, and is bounded on the north, west, and south-west by Oolitic hills, and on the south-east by the Chalk Wolds. The remarkable course of the Derwent —which, rising near the coast, flows westward instead of taking the valleys to the east—is a well-known instance of erratic river flow, and points to an extension of high land much further to the eastward in the early period of the formation of this vale. The whole of the drainage of this oval area is carried away by the Derwent through the gorge at Malton, and in the opinion of many observers this basin was once a lake or great sea-loch.

On either side of Kirkby Moorside a long sinuous valley runs northwards cutting deep grooves into the table-like hills and exposing interesting sections of the Middle and Lower Oolitic beds, which dip gently to the south and are exposed in order as we pass northwards. The Lower Oolites, which in this area consist of a great series of estuarine, marine, and freshwater beds, divided into three series, 'each of which is capped by a thin but well-marked band full of marine fossils' (Fox-Strangway), are exposed at the northern extremities of these valleys, but in their lower reaches the beds seen are confined to the Middle Oolites. It is to these that the attention of the geological section will be principally directed. Immediately above the dark shales of the Cornbrash (the topmost bed of the Lower Oolites) comes the Kellaways rock, which in this area is a 'thick-bedded soft sandstone, usually rather ferruginous.' 'In its upper portion there is a red calcareous band from which most of the fossils are obtained, the rest of the formation being entirely unfossiliferous.' This band contains several species of Ammonites and many bivalves. The Oxford clay in this area is a grey sandy shale 'lithologically very unlike its equivalent in the south of England.' Its fossils are few in number and badly preserved.

The Lower Calcereous Grit is 'a masssve, yellow, calcereous sandstone, becoming more shaly towards its lower portion.' Above this come the Passage Beds with the 'Greystone,' a hard siliceous rock much false bedded.

The capping rock of a great part of the tabular hill above Kirkby is the Coralline Oolite, a massive thick bedded limestone 'composed of minute Oolitic grains with a great number of fossils.' The limestone is divided into two principle beds, separated by a thin set of sandstones known as the Middle Calcareous Grit. Kirkby Moorside itself stands on the Upper Calcareous Grit, whilst the rising ground immediately above the town to east, west, and south is capped by blue Kimeridge Clay. This clay is supposed to underly the greater part of the post-glacial deposits of the Vale of Pickering, but it is only revealed in occasional patches in the central area.

Patches of boulder clay occur in the neighbourhood of Kirkby, one of which is cut through by the North Eastern Railway near Kirkby Mills.

In the Coralline Oolite of this area there are many caves, one of which—the Cave of Kirkdale—is celebrated by the researches of Buckland. This cave, which is situated at the entrance to Kirkdale, contained an extensive accumulation of bony remains covered by a deposit of mud, the whole overlaid by stalagmite. No human remains or traces of human workmanship have been found in this cave, nor is there evidence of more than one period of occupation by predaceous beasts (Phillips). The cave would appear to have been a hyæna den, most of the bones being well gnawed, and the proportion of hyæna remains being exceptionally large.

BOTANY.—The Botanical Section will be officially represented.

Flowering Plants:—Mr. H. Slater writes:—The district is a paradise for botanists, though many of the most interesting plants are not now in bloom. It should be noted how various species affect the limestone and calcareous grit respectively, as they crop out in the dales. The following are amongst the plants that should be met with:—*Aquilegia vulgaris*, *Actæa spicata*, *Hypericum montanum*, *H. pulchrum*, *Geranium pratense*, *G. pyrenaicum*, *Euonymus europaeus*, *Rubus saxatilis*, *Prunus padus*, *Epilobium angustifolium*, *Carduus eriophorus*, *Inula conyza*, *Atropa belladonna* (abundant in Douthwaite Dale), *Parnassia palustris*, *Solidago Virgaurea*, *Campanula latifolia*, *Vaccinium Vitis-idæa*, *Pyrola media*, *Hyoscyamus niger*, *Veronica montana*, *Melampyrum pratense*, *Trientalis europæa*, *Drosera rotundifolia*, *Myrica gale*, *Epipactis palustris*, *Orchis pyramidalis*, *O. incarnata*, *Habenaria conopsea*, *H. viridis*, *H. bifolia*, *Orchis apifera*, *Melica nutans*, *Paris quadrifolia*.

A typical valley of the district is described in Baker's "North Yorkshire."

Mosses and Hepatics.—The Yorkshire Bryological Committee will be officially represented.

Mr. W. Ingham writes :—On 22nd May, 1899, I found the following mosses on the roadside to Lastingham, *Dictiodontium pellucidum*, in abundant fruit. At Hutton-le-Hole, *Barbula rubella*, *B. fallax*, var. *brevifolia*, *B. rigidula*, *B. unguiculata*, *Bryum pallens*, and *Hypnum palustre*. On the side of Kirkdale Cave Quarry, *Dicranella rufescens*, *Plagiothecium depressum*, *Amblystegium Kochii*, *Eurhynchium praelongum* var. *rigidum*, *E. myosuroides* var. *cavernarum*, *E. murale* var. *julaceum*. The only Hepatic then seen was *Marchantia polymorpha* at Hutton-le-hole. The best ground for mosses is the quarry around Kirkdale Cave. If not too far, Beck Dale, Helmsley, is very rich in rare and interesting Mosses and Hepatics, as in Flowering Plants.

Fungi.—The Yorkshire Mycological Committee will be officially represented. Mr. C. Crossland will be happy to name any species sent to him.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will be officially represented.

Birds.—Mr. H. Slater writes :—The Pied Flycatcher is common in all the dales. The Wood Warbler, generally abundant in the dale woods, is decidedly scarce this year Its plaintive call may still be heard.

A Lesser Spotted Woodpecker successfully reared a brood at Helmsley this summer. The Redstart is still here—the hens and young. The males seem to have left the woods, if not the district.

CONCHOLOGY—The Conchological Section will be officially represented by Mr. W. Denison Roebuck.

ENTOMOLOGY.—The Entomological Section will be officially represented by its president, Mr. M. L. Thompson.

Hymenoptera.—The Rev. T. A. Marshall, M.A. who was one of our best authorities on *Ichneumonidæ*, was for some months Curate of Lastingham, where he collected numerous species of this group, which are all recorded in Mr. W. Denison Roebuck's papers on Yorkshire Hymenoptera (Trans. Y. N. U. 1878-1883, and Victoria County History of Yorkshire 1907).

Coleoptera.—The Yorkshire Coleoptera Committee will be officially represented.

Mr. E. G. Bayford writes :—On a former visit (see "The Naturalist" for 1893, p. 319) the coleopterists present made but a meagre list of some thirty odd species. Amongst these were *Ocypus morio* Grav ; *Philonthus atratus*, Grav., *Dianous caerulescens*. Gyll., *Silpha atrata*, L., *Adalia obliterata*, L., *Chrysomela varians*, Schall. These species are all more or less local in their distribution, and so deserving of special mention. Indeed *Philonthus atratus* is an addition to the Yorkshire List, as the above record was, by an unfortunate oversight, omitted when the list was published in 1907 ; and so far as I know the species has not been recorded from any other locality in the country.

The district is a very rich one in many ways, and there is no reason why the list of species known to occur in it should not be very materially increased on the present occasion.

ARACHNOLOGY.—

Mr. Falconer writes :—Not a single record exists for the district which is but one of many in Yorkshire which as yet has not been worked for its spiders. The season is not considered a good one, but, with heather-clad moors and wooded dales available, some interesting discoveries ought to be made.

PROGRAMME OF MEETINGS :—

5-0 p.m.—Tea, 1/6 per head
5-45 p.m.—Sectional Meetings } at the White Horse Hotel.
5-50 p.m.—General Meeting

TRAINS LEAVE KIRKBY MOORSIDE FOR York, Malton, Thirsk, etc., at 5-56 ; Pickering, Scarborough, etc., at 6-52.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before August 12th to the Secretary of the Y.N.U., the Museum, Hull.

Circular 226.]

Yorkshire Naturalists' Union.

THE 226TH MEETING

WILL BE HELD AT

SCUNTHORPE,

Jointly with the Lincolnshire Naturalists' Union,

ON

Thursday, August 25th, 1910.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland and N.E. Railways, which have booking arrangements for Scunthorpe, to Members and Associates of the Y.N.U., surrendering the Certificate noted below. Tickets will be available for the outward journey on the 24th or 25th August, and for return on the 25th or 26th August. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by the Secretary of the Union. Members and Associates wishing for this Certificate must apply to Mr. Sheppard for it. At Stations on the N.E. and H. & B. Railways, tickets at the reduced fare will be issued on production of the signed card of membership.

BOOKS AND MAPS.—The whole area is included in Sheet 86 of the One-Inch Ordnance Map, which may be obtained geologically coloured.

For information concerning the geology of the district, see Canon Cross's "Geology of North West Lincolnshire," Q.J.G.S., Vol. xxxi, No. 122, 1875, p. 116.; "Geology of North Lincolnshire and South Yorkshire," and "The Water Supply of Lincolnshire" (Geological Survey Memoirs).

THE DISTRICT to be investigated is full of interest to all sections. It is situated on the Oolitic and Liassic Escarpments, and offers a rich and varied Fauna and Flora. There has been little systematic collecting and recording done in the district, but, owing to its varied soils, woods, sandy wastes, and water ditches, there is a good covering for many species of animals and plants, and it will well repay the trouble of the naturalist, whether he be collector, observer, or photographer. The district is well known for its neolithic remains which are frequently found in the blown sand. The ironstone, which is extensively worked and offers splendid sections to the geologist, is a Ferruginous Limestone and contains an abundance of fossils, which include large pieces of drift wood, and vertebrae of saurians. In some of the ironstone mines is a fine bed of peat, in which horns of deer have been found, and with oak, birch, and hazel (from plentiful supply of nuts found) as the chief trees.

HEADQUARTERS.—Swaby's Blue Bell Hotel, Scunthorpe.

ROUTES:—The party will leave the station at 10-30, after the arrival of the trains from Doncaster, Lincoln, Gainsborough, Hull, etc.

The geologists, under the leadership of Mr. A. C. Dalton will proceed *via* Dawe's Lane to Appleby Clay-Pit and Santon Limestone Quarry. Connected with the exposures to be seen on this route, which have been described in Canon Cross's "Geology of North-West Lincolnshire," are some interesting geological problems. The district is rich in fossiliferous strata.

The botanists, entomologists, etc., under the leadership of Mr. A. M. Cobban, will proceed *via* Dawe's Lane to the Trent Ironstone Mine, thence to Rifle Hill, where the gull ponds can be visited, and towards Bagmoor. The route passes through woods, moorland, and marshy ground, and will prove rich in plants, insects, etc.

Later arrivals can meet or overtake the earlier party by proceeding along Winterton Road to the ironstone mines, but, as far as possible, leaders will be appointed, and particulars of the routes taken will be posted up at headquarters.

PERMISSION to visit their properties has been kindly granted by Sir Berkeley Sheffield, Bart., Gervase Elwes, Esq., John Long, Esq. (Midland Ironstone Mines), W. Langbridge, Esq. (Lord St. Oswald's Ironstone Mines), Frodingham Iron and Steel Co., Crowle Brick and Tile Co. (Clay-pit, Santon), and the Trent Iron Co.

GEOLOGY.—The Geological Section will be represented by Mr. J. J. Burton, F.G.S., and Mr. T. Sheppard, F.G.S.

Mr. A. C. Dalton writes:—The geology is dealt with in the Geological Survey Memoirs for Sheet 86.

There are several interesting problems in connection with the geology of the district. The survey found it necessary to make the junctions of the divisions from local peculiarities which have not in every case their counterpart elsewhere. Palaeontologically the area embraced in sheet 86 is somewhat exceptional. We find forms elsewhere regarded as zonal here exhibiting a wide range as, for instance, *Am. capricornus*. The following are some of the fossils recorded in the survey list for the Frodingham Ironstone:—*Am. semicostatus*, *Am. Bucklandi*, *Belemnites acutus*, *Pleurotomaria anglica*, *Trancredia*, *Cardium gigantеum*, *C. crassissima*, *C. Listeri*, *Pholadomya ambigua*, *Modiola*, *Hippopodium*, *Lima gigantea*, *Pecten aequalis*, *P. aequivalvis*, *Gryphæa incurva*, *Spiriferina Walcotti*, Crinoids and *Serpula*.

BOTANY.—The Botanical Section will be officially represented.

Flowering Plants—A complete list of the plants recorded for the district has been compiled by Miss Hawkins. This can be consulted at headquarters.

Amongst these are included :—*Myosurus minimus*, *Fumaria capriolata*, *Helianthemum vulgare*, *Althæa officinalis*, *Hypericum pulchrum*, *Geranium pusillum*, *Carlina vulgaris*, *Lythrum salicaria*, *Solanum nigrum*, *Digitalis purpurea*, *Verbascum thapsus*, *Gymnadenia conopsea*, *Euphorbia amygdaloides*, etc.

Mr. H. H. Corbett writes :—Probably few places can show such numerous changes in plant association as can the escarpment on which Crosby Warren stands. The Lias clays seldom come to the surface, except where they are exposed by iron mining operations. For the most part they are covered with blown sand and peat. Where the surface water is held up by the underlying clay, small ponds, bogs, and marshes are formed. Where the sand lies thick and there is free drainage, is a purely psammophilous flora, and every gradation, from one extreme to the other, occurs. As we ascend the hills behind Frodingham a sequence of associations is met with, of which the following may be taken as a type :

(1) **Damp Grass Land**, with patches of sand, *Juncus glaucus*, *J. conglomeratus*, *Carduus palustris*, *Senecio aquaticus*, *Carex arenaria*, gradually changing to

(2) **Sand**, with *Senecio jacobæa*, *Pteris aquilina*. The latter forms a dense jungle bordering

(3) **Marsh**, with *Salix cinerea*, *Myrica gale*, *Juncus* spp., *Typha latifolia*, *Carex* spp., *Menyanthes trifoliata*, *Potentilla palustre*, *Sphagnum* spp. This association gradually changes to

(4) **Thin peat over sand**, with *Salix aurita*, *Hydrocotile vulgaris*, *Anagallis tenella*, *Erythræa centaurea*, etc. This gives place to

(5) **Blown Sand**, with *Senecio jacobæa*, *Teucrium scorodonia*, *Pteris aquilina* (stunted , *Equisetum sylvaticum*, *Erica cinerea*, and *Calluna vulgaris*.

Besides the above, which may be called the NATURAL associations of the district, there are some very interesting points for study where, in consequence of mining operations, wide areas of recently disturbed soil are exposed for the benefit of the more energetic of colonizing plants. Here a totally different flora is to be found ; among the more prominent of the usurpers being *Epilobium angustifolium*, *Apera spica-venti*, *Diplotaxis muralis*, *Sisymbrium Sophia*, *Rhinanthus major*, *Echium vulgare*, *Borago officinalis*, etc. In fine, ecological botanists are not likely to have a blank day at Frodingham !

Mosses and Hepatics.—The Yorkshire Bryological Committee will be officially represented.

Algæ.—Mr. M. H. Stiles, F.R.M.S., writes that some years ago in one of the shallow ponds on the sandy common, *Volvox lobator* was met with.

Fungi.—The Yorkshire Mycological Committee will be officially represented by its Secretary, Mr. C. Crossland, F.L.S.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will be officially represented.

Mammalia.—Squirrels, Stoat, Weasel, Fox, Hedgehog, Mole, and Long-eared Bat.

Reptiles and Amphibia.—Viper, Grass Snake, and Sand Lizard.

Birds.—Miss Hawkins has compiled a list of the birds of the district which can be consulted at headquarters. Amongst them may be mentioned Kestrel, Gold-crest, Great Tit, Long-tailed Tit, Kingfisher, Nightjar, Tree-creeper, Nuthatch, Heron, Curlew, etc.

CONCHOLOGY—The Conchological Section will be officially represented by Mr. W. Denison Roebuck, F.L.S., and Mr. J. F. Musham.

Land and Freshwater Mollusca.—The parishes of Scunthorpe and Frodingham are fairly rich in land molluscs, especially along the Railway Embankment, where *Cæcilioides acicula* is to be obtained alive, also *Hyalinia fulva*,

H. crystallina, *Helicigona arbustorum*, *Helicella cantiana*, *H. caperata*, var., *ornata* (very fine), *Vallonia pulchella*, *V. costata*, *Pupa muscorum*, *Carychium*, *Clausilia bidentata*, etc., and a few of the commoner slugs and water-snails have been found.

These parishes lie in District 2, North, of the Lincolnshire investigation scheme, while Brumby parish, which is immediately south of Frodingham, is in District 2, South. It is therefore desired that records be kept distinct, and communicated to Mr. Roebuck, who has in preparation for early publication a full and elaborate work on the Lincolnshire mollusca, and will be thankful for any assistance. Division 2, South, is better known than the other, for which a number of common species are yet *desiderata*, such as for example the whole genera *Planorbis*, *Vertigo*, *Milax*, *Ena*, *Succinea*, *Physa*, *Ancylus*, *Valvata*, *Sphærium*, and such common species as *Hyalinia alliaria*, *H. pura*, *Hygromia rufescens*, *Pupa cylindracea*, *Clausilia laminata*, etc.

ENTOMOLOGY.—The Entomological Section will be officially represented.

Lepidoptera.—Mr. H. H. Corbett writes :—I have never done any systematic collecting in the district, but have noted the following species : *Chelonia caia*, *Euchelia jacobæa*, *Agrotis valligera*, *A. præcox*, *Crambus margaritellus*, and *C. inquinatellus*.

Coleoptera.—The Yorkshire Coleoptera Committee will be officially represented by Mr. E. G. Bayford, F.E.S., and Mr. H. H. Corbett, M.R.C.S.

Mr. W. E. Sharp, F.E.S., writes that he collected the following Coleoptera at Scunthorpe, Lincs., June 11th, 1910 :—On sandy and muddy banks of streams, ponds, etc. : *Elaphrus cupreus*, *E. riparius*, *Dyschirius thoracicus*, *Calathus flavipes*, *Bembidium doris*, *Patrobus excavatus*, *Acupalpus consputus*, *Bradycellus cognatus*, *Hydroporus lituratus*, *Laccobius minutus*, *Cytilus varius*, *Symplocaria semistriata*, *Heterocerus laevigatus*, *Lathrobium elongatum* (almost entirely black), *Quedius maurorufus*, *Stenus canaliculatus*, *Platystethus cornutus*, *Trogophlaeus fusculus*, *Bledius fracticornis*, *Lesteva sharpi (?)*, *Olophrum piceum*, *Microzoum tibiale*, *Tachyusa flavitarsis ;* from dead branches of fir : *Adalia obliterata*, *Scymnus discoideus*, *Dryophilus pusillus ;* on gibbeted kestrel, stoat, etc. : *Saprinus nitidulus*, *Dermestes murinus*, *Nitidula bipustulata*, *Omosita discoidea*, *O. colon ;* by general sweeping, beating, etc. : *Homalium florale*, *Telephorus nigricans* v. *discoideus*, *Cistela murina*, *Phaedon armoraceæ*, *Aphthona coerulea*, *Apion pisi*, *Rhinoncus subfasciatus*, *R. gramineus*, *Coeliodes 4-maculatus*, *Dorytomus maculatus* v. *curvirostris ;* in rotten wood : *Euplectus nanus*, *Psylliodes affinis ;* by sifting moss, roots of grass, etc. : *Dyschirius globosus*, *Longitarsus suturellus*, *Cilea silphoides*, *Tachyporus humerosus*, *Bolitobius pygmaeus*, *Gyrophæna affinis*, *Oxypoda longiuscula*, *Stenus melanarius*, *Homalota graminicola*, *H. coriaria ;* in old straw in cow-shed : *Ptinus fur*, *Protenus ovalis*, *Cryptophagus bicolor*, *Atomaria ruficornis*, *Melanophthalma gibbosa*.

Mr. Bayford writes that *Prasocuris phellandrii* has been taken near Burringham.

ARACHNOLOGY.—The Yorkshire Arachnida Committee will be represented by Mr. T. Stainforth.

PROGRAMME OF MEETINGS :—

4-30 p.m —Tea, 1/6 per head
5-15 p.m.—Sectional Meetings
5-25 p.m.—General Meeting
} At Swaby's Blue Bell Hotel, Scunthorpe.

Trains leave Scunthorpe for :

All stations past Barnetby (Hull, Lincoln, Brigg, Gainsbro,' etc.), 6-2 p.m.
All stations past Doncaster (Barnsley, Bradford, Leeds, Sheffield, Halifax, etc.), 7-7 p.m.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before September 12th to the Secretary of the Y.N.U., the Museum, Hull.

CIRCULAR 227.

Yorkshire Naturalists' Union.

President:
Prof. A. C. SEWARD, M.A., F.R.S., etc.

Hon. Secretary:
T. SHEPPARD, F.G.S., F.S.A. Scot., Municipal Museums, Hull.

THE 227TH MEETING

WILL BE HELD AT

SANDSEND, near WHITBY

For a Fungus Foray

In MULGRAVE and ARNCLIFFE WOODS,

From Saturday, Sept. 17th to Thursday, Sept. 22nd, 1910.

Chairman of Mycological Committee:
GEORGE MASSEE, F.L.S., V.M.H., of the Royal Herbarium, Kew.

Hon. Sec. Mycological Committee:
CHAS. CROSSLAND, F.L.S., 4 Coleridge Street, Halifax.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland, and N.E. Railways, which have booking arrangements for SANDSEND, to Members and Associates of the Y.N.U., surrendering the Certificate noted below. Tickets will be available for the outward journey from the 16th to the 22nd September, inclusive, and for return up to, and including the 23rd September. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fare being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by the Secretary of the Union. Members and Associates wishing for this Certificate must apply to Mr. Sheppard for it. At Stations on the N.E. Rly. and H. & B. Rly. tickets at the reduced fares will be issued on production of the signed card of membership.

PERMISSION to visit the fine old Mulgrave Woods has been kindly granted by the Marquis of Normanby; and Arncliffe Woods by A. B. Foster, Esq., J.P. It is requested that care be taken not to disturb the pheasants.

HEADQUARTERS will be at Mr. T. Kidd's Normanby House, Sandsend; and the Workrooms at the School close by from Monday to Thursday.

Application for accommodation at Normanby House must be made through the Mycological Secretary.

Tuesday will be given to the investigation of Arncliffe Woods by a few of the members. The remainder of the time to Mulgrave and district.

Papers on Mycological topics will be given each evening at 7-30, as can be arranged :—

Mr. Massee on "Abstract and Practical Mycology."

Mr. A. Clarke on "Mycological Puzzles."

Mr. Thos. Gibbs on "Relative Frequency of the Species of Agarics."

Mr. Harold Wager on "The Life History of an Agaric."

Mr. Cheeseman will exhibit a series of Mycetozoa, including some from the Rocky Mountains of Canada, collected during his visit to that country in connection with the British Association Meeting last year.

Business Meeting, Tuesday Evening.

Mr. Clarke will have for inspection a collection of coloured drawings of Boleti, etc.

Members are requested to bring their books, microscopes, etc.

Yorkshire Marine Biology Committee.

Chairman: Prof. W. Garstang, M.A., F.Z.S., Leeds.

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

A MEETING

Of the Marine Biology Committee will be held at

REDCAR

From Friday, September 2nd, to Tuesday, September 6th.

HEADQUARTERS : PIER HOTEL, REDCAR.

In the daytime excursions, to be arranged at headquarters, will be taken in search of forms of marine life, and each evening there will be discussions on the specimens collected. It is hoped that a series of lectures can be arranged.

ACCOMMODATION :—Suitable accommodation can be secured at the Pier Hotel. Terms, 5/6 per day. Members desiring accommodation should communicate with the Convener, the Rev. F. H. Woods, B.D., Bainton, Driffield.

Approximate times of low tides at Redcar (mornings), September 2nd, 9-0; 3rd, 9-45; 4th, 10-15; 5th, 11-0; 6th, 11-30.

Trains leave York for Redcar at 8-45, 9-57, 12-50, 2-18, etc., returning at 5-43, 7-2, 8-43, 10-29.

Redcar is an excellent centre for Marine Biology. As this is the first of a series of annual meetings to be held at different parts of the Yorkshire Coast it is hoped that there will be a good attendance.

Yorkshire Naturalists' Union.

THE 228TH MEETING

AND

49th ANNUAL MEETING

WILL BE HELD AT

MIDDLESBROUGH

(Preceded by an EXCURSION to MARSKE),

ON

Saturday, Dec. 17th, 1910.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G N., H. & B., L. & Y., L. & N.W., Midland and N.E. Railways, which have booking arrangements for Middlesbrough or Marske, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. The Tickets will be issued on Friday, the 16th, and Saturday, the 17th December, and will be available for returning on

Saturday, 17th, and up to and including the Monday, December 19th, 1910. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

N.B.—The tickets issued to Marske will be available for break of journey at Middlesbrough, either on the outward or return journey.

At Stations on the North Eastern Railway, Saturday and Week-end Tickets will be issued at single fares for the double journey (minimum, 2/- Third Class). Similar Tickets are issued from many Stations on other Companies' lines.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by the Secretary of the Union. Members and Associates wishing for this Certificate must apply to Mr. Sheppard for it. At Stations on the N.E. and H. & B. Railways, tickets at the reduced fares will be issued on productionof the signed card of membership.

PROGRAMME.

10-42 and 11-48 a.m.—Excursion.

A Field Meeting will be held at the **Marske Quarry** for the purpose of examining the celebrated Bajocian plant bed discovered by Mr. J. M Meek, M.A., and first worked by the late Rev. J. Hawell, F.G.S. Train leaves Middlesbrough for Marske at 10-42 or 11-48 a.m., and the return train leaves Marske at 2-27 p.m. Members taking part in this excursion are requested to proviae themselves with luncheon beforehand. On arriving at Marske the party by the first train will be met by the Rev. G. J. Lane and Mr. T. W. Saunders, who will act as guides. The party by the second train will be met by Mr. J. J. Burton, F.G.S. Permission to visit the quarry has kindly been granted by Mr. T. Senior on behalf of Lord Zetland, and arrangements have been made to fire a few shots in order to expose the plant bed.

The following is an abstract of a paper by the Rev. G. J. Lane, F.G.S., read before the Geological Society, London, on the 9th November, relating to this quarry :—

"The Marske Quarry is situated on the northern side of the Upleatham outlier in the Cleveland district of Yorkshire. It is about 500 feet above sea-level. In the quarry several varieties of rock are exposed, namely shales, small coal seams, sandstones, and a ferruginous bed. The beds are of Lower Oolite age, and belong to the Lower Estuarine Series. As the Millepore bed is absent in the district, the Lower Estuarines and Middle Estuarines may be one continuous deposit. From this quarry *Dictyozamites* was recorded for the first time in England, its occurrence being made the subject of a paper presented by Professor Seward to the Geological Society in 1903. The writer has obtained nearly forty species from the quarry, among which are many charactistic Wealden plants. This discovery is most interesting, especially when one considers the vast interval of time that elapsed between the horizons of the Inferior Oolite and the Wealden."

A further excursion has been arranged for Redcar Rocks and Scars under the leadership of Dr. A. S. Robinson, of Redcar. Train leaves Middlesbrough at 11-48 a.m., returning from Redcar at 2-34 p.m. Those who intend taking part in this excursion are requested to notify the Hon. Sec. of the Cleveland Naturalists' Field Club, Mr. F. Elgee, 23 Kensington Road, Middlesbrough, some few days beforehand.

12-30 to 2-0 p.m.—Luncheon

may be obtained at the Railway Station, Middlesbrough; Hinton's Café, Corporation Road; or at the Corporation Hotel, Albert Road.

The 49th Annual Meeting will be held in the Hall of the Girls' High School, Albert Road. (Six or seven minutes' walk from the Railway Station.)

3-15 p.m.—Sectional Meetings

(which all members and Associates are entitled to attend) will be held for the election of Officers of Sections, and to receive the Annual Reports from their Secretaries.

These will be held in the Class Rooms adjoining the Girls' Hall.

3-30 p.m.—The General Committee at the Girls' School each member of which receives a special summons with this circular) will meet to consider the Annual Report, to elect Officers, and to arrange the Excursion Programme for 1911.

5-15.—Meat Tea at the Corporation Hotel (opposite the Town Hall), at 1/6 each.

6-15 p.m.—The General Meeting

will be held in the hall of the Girls' High School. The Chair will be taken by the President of the Union, supported by prominent members. After the reading of the Annual Report and the announcement of the Excursion Programme for 1911, at

6-45 p.m.—The Presidential Address

will be delivered by Professor Albert C. Seward, M.A., F.R.S., on "The Jurassic Flora of the East Riding in relation to the Jurassic Floras of the World" (illustrated by Lantern Slides). During the delivery of the address, the Chair will be taken by His Worship the Mayor of Middlesbrough, Colonel Sir Samuel A. Sadler, supported by the President of the Cleveland Naturalists' Field Club, Mr. T. A. Lofthouse, A.R.I.B.A., F.E.S., and Mr. J. J. Burton, F.G.S., President of the Cleveland Literary and Philosophical Society, and others.

7-45 p.m. to 10-30 p.m.—Conversazione.

After the delivery of the Presidential Address, the members of the **Cleveland Naturalists' Field Club** invite the members and associates to a Conversazione in the Hall of the Girls High School (Morning or Evening Dress). Acceptance of the invitation must be sent to Mr. Frank Elgee, 23 Kensington Road, Middlesbrough, by Wednesday, the 14th December.

A number of Natural History objects of interest will be on view, in addition to an exhibition of Microscopic Slides arranged by Members of the Cleveland Naturalists' Field Club. Among the exhibits will be "Jurassic Plants" from the Marske Quarry, and other local Geological specimens; Geological sections of the Cleveland district; Local Land and Marine Mollusca; Local British Birds. British Lepidoptera and Coleoptera, etc.

The volumes of Geological Photographs belonging to the Union will also be on view.

During the evening Selections of Music will be given at intervals, and light refreshments will be provided.

The Cleveland Naturalists' Field Club, being desirous of making the meeting as attractive as possible, will be glad to receive offers of help from those members of the Union who possess Microscopes or Natural History objects of interest; it is, therefore, earnestly hoped that all who can conveniently bring instruments and suitable objects will do so. Intending exhibitors are requested to communicate as early as possible with

FRANK ELGEE, Hon. Sec.,

23 Kensington Road, Middlesbrough.

Hotel Accommodation.

Visitors wishing to stay in the district will find first-class accommodation at the Corporation Hotel, Middlesbrough, opposite the Town Hall, at reasonable rates; and at the Zetland Hotel, Saltburn-by-the-Sea. The latter Hotel belongs to the North-Eastern Railway Co., and that Company gives special week-end terms—including fares and tariff—at greatly reduced charges.

Railway Time Table

Trains leave Middlesbrough for:—

North-Eastern Railway.	Darlington	9-17 p.m.	and 10-40 p.m.
	Hull	9-17 ,,	
	York	9-17 ,,	and 10-49 p.m.
	Leeds	9-17 ,,	
	Bradford	9-17 ,,	
	Whitby	8-32 ,,	

Return excursion trains will probably leave Middlesbrough for Bradfor and other Yorkshire Stations in the evening.

Dorman Memorial Museum.

During the meeting Members and Associates may visit the Museum between the hours of 9-0 a.m. and 5 p.m. The Museum is situated at the entrance to the Albert Park from Linthorpe Road, and Tramcars from the Railway Station pass it every 10 minutes. The present building has been erected six years, and contains collections of local insects, shells, fossils from the Lias and Oolite, as well as a number of local antiquities and rock specimens. The general collection is particularly strong in Mammals and Birds, whilst there are extensive collections of Mollusca and fossils. The attention of members is directed to a fine head of *Ichthyosaurus communis* from the Lias of Cleveland, and a specimen, 15 feet in length, of Banks' Ribbon Fish (*Regalacus banksii*), caught in the River Tees.

Election of Additional Members of General Committee.

Voting papers are not sent out this year, but members may vote by postcard addressed to the Secretary, making their choice from the List of Members.

NEW MEMBERS.—A special effort is being made to get a good list of new members for the Middlesbrough Meeting. Towards this the Hon. Secretary would be glad to receive any nominations. The Subscription is 10/6 per annum, and members receive the *Naturalist*, *Transactions*, etc., free. The new volume of the *Naturalist* commences on January 1st.

Yorkshire Naturalists' Union.

THE 229TH MEETING

WILL BE HELD AT

ARTHINGTON,

FOR THE

Investigation of HAREWOOD PARK and vicinity,

ON

Saturday, May. 13th, 1911.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland and N.E. Railways, which have booking arrangements for ARTHINGTON or LEEDS, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Tickets taken on Friday or Saturday, May 12th and 13th, will be available for return on May 13th, 14th or 15th. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by the Secretary of the Union. Members and Associates wishing for this Certificate must apply to Mr. Sheppard for it. At Stations on the N.E. and H. & B. Railways, tickets at the reduced fares will be issued on production of the signed card of membership.

CONVEYANCES will meet the trains arriving at Arthington at 10-16, and from the North at 10-51, to convey Members to the north entrance of the Park. They will be at the same place again at 5 p.m. to take members back to Arthington for tea. Fare, 1/3 each. Will Members desiring seats in the conveyances inform Mr. Fortune at once, so that the desired accommodation may be arranged. As the district is convenient for anyone coming for the afternoon, arrangements may be made for conveyance to the Park, if the seats are booked beforehand.

TRAINS.—For Leeds and the South, 6-19, 7-41, 9-1 p.m. For Harrogate and the North, 6-59, 7-41, 9-33 p.m.

BOOKS AND MAPS.—The whole area is included in Sheet 70 (formerly 93 S.W.) of the One-Inch Ordnance Map, which may be obtained geologically coloured. It is also included in six sheets of the Six-Inch Map (188 N.W., N.E., S.E. and S.W., and 203 N.W. and N.E.)

For information concerning the geology, and fauna and flora of the district, see Y.N.U. Circulars numbers 76 and 141.

THE DISTRICT appointed for this excursion includes the fine Harewood Park, with its varied wood and parkland, fish ponds and the ruined castle in the N.E. corner of the Park. Situated as it is, between the favourite hunting grounds of Ilkley and Otley on the West, and of Collingham and Wetherby on the East, this portion of the Wharfe Valley has received very little attention.

The Leeds Naturalists' Club ask for the fullest and most detailed records, of even the commonest species, for the area of this excursion, which is one of the districts for which they keep records, and very little work has been done.

HEADQUARTERS.—The Wharfedale Hotel, Arthington.

PERMISSION to visit his property has been kindly granted by the Earl of Harewood.

GEOLOGY.—Mr. E. Hawkesworth writes that the proposed route for the excursion does not offer much attraction to the geologist. The district is composed of the "Third Grits," the middle division of the Millstone Grit series. They consist of alternations of grits and shales. Geologists attending may find profitable employment in examining any exposures of the grits for pebbles other than quartz, and the shales for marine fossils, at the same time keeping a look out for "drift" deposits, or erratic pebbles, such as cherts and limestones, of which there is a sprinkling on the surface to the south.

BOTANY.—Dr. F. Arnold Lees. who will accompany the Botanists, writes:—The lordly Harewood demesne, diversified as the surface is with fine timber of oak and wych elm; refreshed beyond the original alder, ash and hazel, at the afforestation of "the Great Planting" in the late 18th century up to the Peninsular War, with mast wood and conifers; seems always to have had for the botanist a sameness, excusary of a lack of interest in the district. Records of particular species, from the day of John Dalton and Archdeacon Pierson down to that of Denny and Wood, are greatly fewer than from the lime-soiled tract of land to the East. The underlying rock is "flagstone" not rich in its floral products; and the extensive plantings of Dutch elm, beech and some iron-wood hornbeam, with many sweet chestnut trees (now noble and occasionally fruit-bearing), has somewhat increased the flora with species such as *Helleborine atroviridis*, Linton (introduced with soil at the roots of the original settings from elsewhere). Among "suspects" the Alien Leopard's-Bane flaunts its cadmium-yellow crowns in the holt at the S.E. corner of the estate's stone fence; meddle-with-nature-gardener planted, amidst the natural-to-the-soil Red-campion, White Ramp and Green Mercury. In the Temple silva, too, the spotted leaf Lungwort, in purple bloom in Spring, and natural to the S.E. of England, used to flourish, but deliberately planted also. In the muddy plashes—not real "dew-ponds"—of the pastures towards Owlet Hall (significant title) and Eccup Reservoir, Lenormand's White Crowfoot grows, with the sweet White Water Crowfoot as well. Here and there, in and by brooklets, the bitter Cuckoo Cress (*C.amara*) silver-petalled and purple anthered, will be prominent; but *Myosotis silvatica*, though not quite absent, is

unforgetably scarce on the shaded mossy banks where Ground Ivy alone supplies its colour note of grey blue; although of course, in open spots, the Germander-leaved Speedwell bids us "on and hope" with its face of brightest cheer; and indeed, if signatures, and the impression a thing conveys may buttress sentiment, the True-Image *Chamædrys* is the Yorkshire Forget-me-Not.

The "meet" for our chase is too early for the *Helleborine* referred to, as also for the turquoise Giant Bellflower, the mollissimine Rosæ, and some interesting evolutions of *Rubus fruticosus*. Best of a pretty but little lot, for investigating which the time is ripe, there will be the Toothwort, in crumbling mould at the "footstools" of elms and hazels.

Mosses and Hepatics.—Mr. W. D. Roebuck writes:—At Harewood have been found *Dicranum majus*, *Pleuridium subulatum*, *Barbula papillosa*, *B. lævipila* (on orchard trees), *B. cylindrica* (on sunk fence wall in the Park), *Bryum atropurpureum*, *Plagiothecium sylvaticum*, and *Aulacomnium androgynum* (the Park). At Pool occur *Trichostomum tophaceum* and *Orthotrichum leiocarpum*, and *Zygodon viridissimus* is on old hawthorns there.

Mr. W. Ingham adds:—*Tortula papillosa*, *Bryum atropurpureum* and *Neckera complanata*. At Collingham have been found *Eurhynchium myurum*, *Brachythecium rivulare*, *B. plumosum*, *Plagiothecium elegans*, *P. silvaticum* and *Hypnum hispidulum* var. *Sommerfeltii*, also the Hepatics *Lepidozia setacea* and *Pellia Endiviaefolia*.

In the Naturalist for 1902, Mr. Geo. B. Savery recorded 147 Mosses from the Pool district, comprising the Wharfe Valley from Farnley to Harewood. Among these are several interesting and rare species, and efforts should be made to re-discover these, and to make additions to those already recorded.

Freshwater Algæ.—The only work that has been in the district is that of Mr. W. West and his son, Prof. G. S. West. At Arthington they have collected *Scenedesmus quadricaudatus*, *S. acutus*, *Cosmarium meneghinii*, *Spirulina oscillarioides*, *Oscillatoria irrigua*, *Closterium leibleinii*, *Staurastrum punctulatum*, *Raphidium convolutum*, *Botryococcus Braunii*, *Diatoma vulgare*, *Fragilaria capucina*, *Navicula amphisbæna*, *Pleurosigma acuminatum*, *Achnanthes exilis*, *Cocconeis pediculus*, *Synedra pulchella*, *Nitzschia sigmoidea*, *Melosira varians*, *Cyclotella operculata*, *Encyonema cæspitosum*, *Cymbella cistula* and *C. lanceolata*. In a pond at Pool were found *Cymatopleura solea*, *Navicula cuspidata*, *Nitzschia tenuis* and *N. acicularis*. At Wigton Moor, near Wike, they record *Glœocystis ampla*, *G. rupestris*, *Rhaphidium falcatum*, *Scenedesmus acutus*, *Gonatozygon ralfsii*, *Docidium ehrenbergii*, *Clostorium dianæ*, *C. Venus* (also found at Alwoodley), *C. striolatum*, *C. juncidum*, *C. rostratum*, *C. setaceum*, *C. lineatum*, *Pleurotænium ehrenbergii* var. *granulatum*, *Euastrum ansatum*, *E. binale* forma *minor*, *E. pectinatum*, *Xanthidium antilopæum*, *Cosmarium cucumis*. *C. phaseolus*, *C. reniforme*, *C. subpunctulatum*, *C. substriatum*, *C. ochthodes*, *C. succism*, *Staurastrum dickier*, *S. subcruciatum*, *S. polymorphum*, *Pediastrum boryanum*, *Tetmenorus granulatus*, *Micrasterias denticulata*, *Eaustrum insigne*, *E. ampullaceum*, *E. elegans*, *Arthrodesmus octocornis*, *A. convergens*, *Staurastrum teliferum*, *Mesocarpus parvulus*, *Oscillatoria limosa*, *Hormiseia subtilus*, *Ophiocytium cochleare*, *Penium margaritaceum* v. *punctatum*, *Closterium parvulum*. *C. leibleinii*, *C. gracile*, *Scenedesmus denticulatus* v. *linearis*, *Rhaphidium polymorphum* v. *aciculare*, *Tretraëdron regulare*, *Characium heteromorphum*, *Palmodictyon subramosum*, *Ineffigiata neglecta*, *Glœocystis vesiculosa*, *Protococcus protogenitus*, *Tabellaria ventricosa*, *Stauroneis phœnicenteron*, *Navicular nobilis* v. *dactylus*, *N. major*, *N. brebissonii*, *N. Gibba*, *N. cryptocophala*, *N. Gallica*, *Ennotia linearis*, *Comphonema acuminatum*, *G. fenellum*, *Achnanthes exilis*, *Synedra acus*, *Asterionella formosa*, *Stauroneis anceps*, *Encyonema gracile*, *Cymbella parva*, *Lyngbya subtile*, *Aphanothece saxicola* and *Chroococcus turgidus*.

Lichens.—*Pertusaria dealbata* and *Lecanora varia* in Harewood Park are our only records.

Fungi.—Mr. C. Crossland writes:—Harewood Park was one of the two districts visited in 1888, when the September meeting was organised by the Secretaries as a Fungus Foray. The visit was considered very successful, many fungi of special interest being found. Ten years later the Union arranged a Foray at East Keswick,

the district explored being within the magnificent Harewood Estate, including the North-Eastern portion of the Park. *A. saccobolus*, new to science, was found on that occasion. Of course, mid-May is not the season for a crop of fungi, but a few Spring species are certain to be met with by careful investigation of the ground.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will be officially represented.

Mr. R. Fortune writes:—The district is exceedingly rich in bird life. The Green and Great Spotted Woodpeckers are to be found, also the Tree Creeper and most Northern woodland species. Three species of Owls, Hawfinch, Red Flycatcher, Gold Crest, etc. Owing to strict preservation, Hawks are not tolerated. A small and gradually diminishing Heronry may be be seen in the Park. On the lake several pairs of Great Crested Grebes and a fine herd of Whooper Swans may be seen, and in an enclosed lake are a number of extemely interesting wild fowl. With regard to the smaller mammals very little has been done in working them out. Information, especially with regard to the Bats, is particularly desired No records appear to have been published with respect to the Fishes and Reptiles.

CONCHOLOGY.—The Conchological Section will be officially represented.

Land and Freshwater Mullusca.—Mr. W. D. Roebuck writes:—There is but little known, the geological formation being an unfavourable one. Roadsides in and by the Park have yielded *Hygromia rufescens*, *Hyalinia cellaria*, *Pyramidula rotundata*, *Pupa cylindracea*, etc. *Sphyradium edentulum* was found at Harewood by Mr. W. Nelson. *Cochlicopa lubrica* has occurred at Castley and Pool Bank, *P. rotundata* also *Hygromia hispida* at Netherby and var. *subrufa* at Pool, *H. rufescens* is abundant on Pool Bank. *Helix hortensis* at Pool and common at Weeton, *H. nemoralis* occurs on Pool Bank and at Weeton, *Hyalinia helvetica* occurs at Pool Bank and at the south end of Arthington Viaduct, *H alliaria* at Weeton and *H. cellaria* at Arthington. Of freshwater shells *Limnæa peregra* occurs in various waters, and *Planorbis spirorbis* at Pool, and Mr. W. Nelson took *Pl. albus* commonly at Hollin Lake, near Wike.

The fish-pond should be searched for water-shells and the woods for woodland forms. A visit to the backwater near Carthick Ford might be worth while, and there are holocene fossils on the Wharfe bank not far off.

ENTOMOLOGY.—The Entomological section will be officially represented.

Lepidoptera.—Mr. W. D. Roebuck writes:—The only records are as follows: *Colias edusa*, *Vanessa cardui*, *Polyommatus icarus*, *Macroglossa stellatarum* and *Anisopteryx æscularia* have occurred at Arthington, *Chortobius pamphilus* at Dunkeswick. *Abraxas grossul riata*, *Xylophasia rurea*, *Mamestra persicaria* and *Plusia chrysitis* at Weeton Bridge, *Camptogramma bilineata* at Pool and *Gonopteryx libatrix* at Pool Bridge, *Orgvia antiqua* and *Hybernia aurantiaria* at Harewood and *Urapteryx sambucata* in the Park. This shows how urgent is the need for further records, even of the commonest species.

Diptera —Three species only are on record: *Hæmatopota pluvialis* (Cleg) at Weeton, *Mesembrina meridiana* and *Homalomgia brevis* at Pool.

Neuroptera.—Nothing known.

Coleoptera. Nothing on record.

Hymenoptera.—The only records are of a sawfly, *Trichiosoma betuleti*, at Arthington: a fossor, *Blepharipus dimidiatus*, and two humble-bees, *Bombus lapidarius*, *B. hortorum* and *Chrysis ignita* at Harewood.

PROGRAMME OF MEETINGS.—

5-30 p.m.—Tea, 1/6 per head
6-0 p.m.—Sectional Meetings
6-15 p.m.—General Meeting
} at the Wharfedale Hotel.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before May 20th, to the Secretary of the Y.N.U., the Museum, Hull.

CIRCULAR 230.]

Yorkshire Naturalists' Union.

THE 230TH MEETING

WILL BE HELD AT

CASTLETON

(N. Yorks)

ON

Whit week-end, June 3rd-5th, 1911.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland and N.E. Railways, which have booking arrangements for CASTLETON (N. Yorks), to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Tickets taken on Friday or Saturday, June 2nd and 3rd, will be available for return on June 3rd to 6th inclusive. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by the Secretary of the Union. Members and Associates wishing for this Certificate must apply to Mr Sheppard for it. At Stations on the N.E. and H. & B. Railways, tickets at the reduced fares will be issued on production of the signed card of membership.

BOOKS AND MAPS.—The area to be investigated is included in Sheets 43 and 34, New Series of the One-inch Maps, geologically coloured.

For information concerning the geology, fauna and flora of the district see Canon Atkinson's "Forty Years in a Moorland Parish," Tate & Blake's "Yorkshire Lias," Cowper Reed's "Geological History of the Rivers of East Yorkshire," Kendall's "System of Glacier Lakes in the Cleve and Hills" (Q.J.G.S., 1902), Fox-Strangways "Jurassic Rocks of Yorkshire," Baker's "North Yorkshire," Nelson's "Birds of Yorkshire," and Papers in the Proceedings of the Cleveland Naturalists' Field Club, Vols. 1 and 2.

HEADQUARTERS.—The Headquarters during the meeting will be at the "Robin Hood" Hotel, Castleton.

ACCOMMODATION.—For those staying the week-end, the terms are (exclusive of sandwiches) 7/- per day for bed, breakfast and dinner at the "Robin Hood" Hotel. The accommodation at the Hotel is limited (four or five rooms), but other apartments may be obtained at Coronation Boarding House, and elsewhere in the village. As Castleton will be full of visitors at Whitsuntide, applications for rooms should be made immediately. In cases of great difficulty in obtaining rooms, Mr. J. W. R. Punch, Howe View, Castleton, will be pleased to find suitable accommodation.

EVENING MEETINGS.—An evening meeting will be held on Saturday, when Mr. Frank Elgee, F.G.S., will read a paper on "The Peat Beds and other Superficial Deposits of the Eastern Moorlands."

ROUTES.—Saturday.—After the arrival of the 8-46 train all sections will take the following route from the station: Up the Moor slopes to Castleton Ganister Quarries, and thence across the Moors to White Cross Swangs, Dimmingdale Quarry, Freeborough Hill, etc,, returning by way of Girrick and Ewe Crag Slack to Danby. This ground though mostly moorland is extremely interesting to all sections.

June 4th.—For those who desire it, the choice of two or three very interesting walks can be made.

Monday.—After the arrival of the 8-46 train all sections will proceed up Danby Dale as far as Falcon Farm. The route will then be over the Moors to Trough House, *via* Great Fryup Head to George Gap Spa, over rough broken ground at Fryup Head, through Little Fryup Dale, by Danby Castle, and Danby Brick and Tile Works, back to Castleton.

LEADERS.—Mr. J. W. R. Punch, President of the Cleveland Naturalists' Field Club, Mr. Frank Elgee, F.G.S., and Mr. J. J. Burton, F.G.S.

PERMISSION to visit their estates has been kindly granted by Viscount Downe, Lord Boyne, Mr. G. A. Macmillan, Captain R. B. Turton, and Messrs. Flintoft.

THE DISTRICT to be investigated includes the upper portion of the beautiful valley of the Esk, the moorlands of central Cleveland, and the great dales of Baysdale, Westerdale, Danby Dale, and Fryup Dales, rendered so celebrated by Canon Atkinson's "Forty Years in a Moorland Parish." The village of Castleton, in the Parish of Danby, is situated on a narrow ridge dividing Eskdale from Danby Dale, and is surrounded by wide spreading moors and finely wooded hills and dales.

GEOLOGY.—Mr. Frank Elgee writes: Castleton is a good centre for studying the inland character of the Inferior Oolite Rocks from the Dogger to the Kellaways Rock. The Lias is exposed in Baysdale, Westerdale, and Danby Dale, but good sections are rare. The routes have been so arranged as to afford an opportunity to examine the chief beds of the Oolite, including the Grey Limestone Series (here very coarse and gritty, and very unlike its appearance on the coast at Peak or

Hundale Point), and the Moor Grit, these being well seen in the Castleton Ganister Quarries. North of Eskdale, in the vicinity of Freeborough Hill, there is a large outlier of the Kellaways Rock lying in a synclinal trough. The rock is a coarse, yellow sandstone with quartz pebbles, and contains very few fossils. It is well exposed in Dimmingdale Quarry, near Freeborough Hill, which is a remarkable outlier of the same formation. The Kellaways Rock is much faulted, and the faults are clearly indicated by its outcrop. Geologists will also be able to examine the old workings for coal near Danby Beacon. This coal is of poor quality, and occurs beneath the Grey Limestone Series, and is about two feet thick at most. Plant remains are of sporadic occurrence in the Estuarines, chiefly *Williamsonia gigas* and *W. pecten*. *Zodites williamsoni* has also been found, whilst quite recently I have received a specimen of *Laccopteris polypodioides* from the Commondale Quarries.

The relationship of the geology to the surface topography is remarkably clear in this area, and special attention will be directed to the features of the dales and their erosion.

The following strata can be seen in this district: Middle and Upper Lias, Dogger, Lower Estuarine Series, with the Eller Beck Bed and Coal Seams, Grey Limestone Series, Upper Estuarines with Moor Grit at base and Cornbrash at top, Kellaways Rock.

There are also several exposures of the Cleveland Dyke is this area.

The Glacial Geology of the Castleton district is extremely interesting, and has been fully elucidated by Professor Kendall (System of Glacier Lakes in the Cleveland Hills, Q.J.G.S., 1902). Eskdale itself in glacial times was occupied by a large extra-morainic lake on the floor of which various deposits were formed. An opportunity will be taken to examine the lake silts at the Danby Brick and Tile Works, whilst between Castleton and Commondale are some remarkable gravel fans, considered by Professor Kendall to be the deltas of a lake overflow out of Kildale. Saturday's route will enable geologists to study the boundary of the drift on the northern side of Eskdale, and during the meeting special attention should be directed to the differences between the glaciated and non-glaciated areas, the latter chiefly occupying the high moorlands to the south of Eskdale. Glacial overflows are not uncommon, particularly near Freeborough Hill, and include the two curious little marginal overflows, termed the ' double" by Professor Kendall, the in-and-out channel of Spring Head Hole, and the great direct overflow of Ewe Crag Slack which crosses the North Cleveland watershed and debouches into Eskdale above Danby End.

BOTANY.—The following are among the rarer plants of the Castleton district: *Vaccinium vitis-idæa*, *Empetrum nigrum*, *Drosera rotundifolia*, *Pinguicula vulgaris*, *Trientalis europæa*, *Genista anglica*, *Juniperus communis*, *Myrrhis odorata*, *Ægopodium Podagraria*, *Hottonia palustris*, *Adoxa Moschatellina*, *etc.*

Reindeer Lichen *(Cladonia rangiferina and sylvatica)* are characteristic species of the Castleton Moors, whilst the pubescent variety of Ling *(Calluna vulgaris*, var. *incana)* is very abundant in places.

BOTANICAL SURVEY.—Mr. Frank Elgee, F.G.S., writes: Moorland associations are in evidence at Castleton. Pure Heather Moor is the most characteristic community, though varying considerably. On dry porous sandstone, with little or no overlying humus, the Heather, even when dominant, is short and thin, whereas on deepish peat it is very rank. The effects of burning the Moors should be carefully noted since this produces a marked alteration in the plant life. See "Vegetation of Swiddens in North-East Yorkshire," *Naturalist*, January and February, 1910. Other associations that will be seen include the Bracken Slope. Cotton Grass Bogs, and Junceta in slacks and hollows, Grass Moors, both of *Nardus* and *Molinia*, as well as upland woods of Birch and Oak, with undergrowths of Ling or Bilberry. In some associations the Cow-berry *(Vaccinium vitis-idaea)*, and the Crowberry *(Empetrum nigrum)* are numerous.

MOSSES.—The Bryological Section will be represented by Mr. W. Ingham.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will be officially represented.

Mammals.—Mr. T. A Lofthouse writes that the Otter is abundant in the Esk, and Badgers occur in the district.

Reptiles.—Both the Viper and Ringsnake occur in the district, whilst the Blindworm and Lizard are common.

Birds —The Curlew, Nightjar, Merlin and Golden Plover breed in the district.

ENTOMOLOGY.—The Entomological Section will be officially represented.

Lepidoptera.—Mr. T. Ashton Lofthouse, F.E.S., writes: The Castleton district is one which from its high situation is good ground for the moorland species, the valleys also provide a fair amount of woodland, etc., which may possibly, if worked, provide good results entomologically.

Of the Butterflies the Green Hairstreak, *Thecla rubi*, should be out at the date of this meeting. The Large Heath, *C. typhon*, occurs on adjacent Moors later in the season. Among the other orders that occur and may be out at the time of this meeting are *N. plantaginis* and its var. *hospita*, *B. rubi*, *B. quercus*, *S. pavonia*, *C. furcula*, *Acronycta leporina*, and *A. menyanthidis* (at rest on stone walls), *C haworthii* (larvæ), *A. agathina* (larvæ, sometimes common on the Moors), *H. dentina*, *H. glauca* (on stone walls), *C. solidaginis* (larvæ), *P. interrogationis* (larvæ), *G. filigrammaria* (larvæ on Moors), *G. autumnata* (larvæ among alder and birch), *L. cæsiata* (larvæ), *L. salicata*, *S. belgiaria* (larvæ), *B. piniaria*, *M. tristata*, *H. ruberata*, etc.

Among the micro lepidoptera the following have been taken in the Cleveland moorland district, some of which should be out at the time of this meeting: *Peronea caledoniana* (larvæ), *Per. mixtana*, *Pen. soroculana*, *Phox. myrtillana*, *Cap. favillaceana*, *Clepsis rusticana*, *Grap. geminana* (larvæ), *Eph. similana*, *P. solandriana* and *sordidana* (larvæ), *Pam. mercuriana*, *S. internana*, *L. æthiops*, *Elac. kilmunella*, etc.

Coleoptera.—Mr. M. L. Thompson writes: Some interesting upland Beetles are to be found on the Castleton and Danby Moors, including *Carabus arvensis*, *Miscodera arctica*, *Bradycellus cognatus*, *B. collaris*, *Pterostichus vitreus*, *Calathus micropterus*, *Bembidium nigricorne*, *Hydroporus morio*, *H. melanarius*, *H. obscurus*, *Mycetoporus lepidus*, *Philonthus scutatus*, *Mysia oblongoguttata*, *Coccinella hieroglyphica*, *Byrrhus fasciatus*, *Aphodius fœtidus*, *A. borealis*, *Geotrupes typhœus*, *G. sylvaticus*, *Donacia discolor*, *Strophosomus retusus*.

The Coleoptera Committee will be represented by Mr. M. L. Thompson, F.E.S.

PROGRAMME OF MEETINGS.—Whit-Monday.

5-0 p.m.—Meat Tea, 1/3 per head
5-45 p.m.—Sectional Meetings } at the "Robin Hood" Hotel.
6-0 p.m.—General Meeting

6-35 p.m. Train leaves Castleton for Northallerton, Middlesbrough, Darlington, etc..

5-28, 5-53, 9-27 p.m. Trains leaves Castleton for Whitby.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before June 12th, to the Secretary of the Y.N.U., the Museum, Hull.

[Circular 231].

Yorkshire Naturalists' Union.

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ALFRED HARKER, M.A., F.R.S., Cambridge.

Ex-Presidents:

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Prof. A. C. Seward, M.A., F.R.S., etc.

Hon. Secretary:

T. SHEPPARD, F.G.S., Municipal Museums, Hull.

THE 231ST MEETING

WILL BE HELD AT

BARTON-ON-HUMBER

(N. Lincs)

Jointly with the Lincolnshire Naturalists' Union,

ON

Saturday, July 1st, 1911,

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland and N.E. Railways, which have booking arrangements for Barton-on-Humber, to Members and Associates of the Y.N.U. or L.N.U., surrendering the Certificate noted below. Tickets taken on Friday or Saturday, June 30th and July 1st, will be available for return on July 1st to 3rd inclusive. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by the Secretary of the Union. Members and Associates wishing for this Certificate must apply to Mr. Sheppard for it. At Stations on the N.E. and H. & B. Railways tickets at the reduced fares will be issued on production o the signed card of membership.

TRAINS LEAVE FOR

Hull, 5-15, 6-35, 8-35, 9-35.
Grimsby, 5-15, 6-35, 8-35.
Lincoln, 5-15.

BOOKS AND MAPS.—The whole area is included in Sheet 86 of the One-Inch Ordnance Map, which may be obtained geologically coloured, and in the drift edition.

THE DISTRICT to be investigated includes the well known Barton and South Ferriby Chalk Quarries and Humber Foreshore. Fresh-water Drains and deep "Blow Wells" are available along the route for those interested in Pond Life or Fresh-water Mollusca.

HEADQUARTERS—George Hotel, Barton.

Accommodation—For those desiring to stay the week-end the terms are 5/- per day for bed, breakfast, sandwiches and dinner. Applications should be made to Mr. J. G. Squires, George Hotel.

ROUTES.—On the arrival of the 11-5 train the party will proceed via the Dam Road, which is bordered by drains and across the fields to the Chalk Quarries and Humber Foreshore, and return via the Westfield Road to the George Hotel.

PERMISSION to visit their properties has been kindly granted by J. B. Tombleson, Esq., Messrs. Robson's Cement Co., Ltd., Messrs. Skelsey's Cement Co., and Harry Walker, Esq.

GEOLOGY—The Geological Section will be officially represented by Messrs. T. Sheppard, F.G.S. and J. W. Stather, F.G.S.

Mr. T. Sheppard, F.G.S., writes:—From a Geological point of view, the district between South Ferriby and Barton-on-Humber is of great interest. For much of this distance there is a low-lying belt of old Humber silt, protected by an embankment from inundation by the high tides. This silt is largely excavated for brick making and the manufacture of cement. Below the silt is usually a bed of peat, of varying thickness, with remains of oak, birch, etc., and occasionally horn-cores and bones of *Bos primigenius*, the ox, red deer, etc. Beneath the peat is the pre-glacial floor of the Humber, which rises at the foot of the chalk. This indicates that the estuary was formerly of greater dimensions than to-day. Near South Ferriby the edge of the old Humber coincides with its present-day margin, and, in places, the pre-glacial floor can be easily traced, and here and there glacial striæ occur on the harder masses of rock, indicating that during the Great Ice Age a lobe of ice came up the Humber from the east. Near to the Humber shore, the northern escarpment of the Lincolnshire Wolds has been extensively quarried, there being three or four enormous chalk pits, which are still being worked. These shew sections in the middle and lower chalk, and the "black band" or *Belemnitella plena* zone, which divides the two, occurs in the lower part of the sections. From this the characteristic belemnite is occasionally found. Fossils are fairly plentiful in these quarries, the small round sea-urchins *(Discoidea cylindrica)*, as well as Terebratulæ and Rhynchonellæ, being common. Very large ammonites, and fish remains, are not uncommom. On the foreshore, near South Ferriby Hall, the red chalk is exposed, and recently a bed of dark clay, which contains fossils distinctly of Neocomian type has been washed bare.

BOTANY.—The Botanical Section will be officially represented by Rev. E. A. Woodruffe-Peacock and Rev. Canon W. Fowler.

Flowering Plants.—The Rev. E. A. Woodruffe Peacock writes:—The flora of this district is as varied as its soils. Chalk, Boulder Clay, Sandy Glacial Gravel and Estuarine Alluvium, are all found with their special combinations of species at Barton and South Ferriby. The want of woods and presence of high cultivation makes the chalk flora purely agricultural, with the exception of the chance combinations of the practically modern quarries. *Lactuca muralis* is there along with *Aquilegia*, *Hesperis*, *Ribes grossularia*, *Vinca major*, *Cytisus laburnum*, *Pyrus mitis*, *Fragaria chiloensis*, and other commoner aliens. *Barbarea vulgaris*, if present, is a sure find for *Helix cantiana*; failing it, *Arctium minus* or *Urtica dioica* are the best apecies. The Estuarine alluvium supplies *Triglochin maritimum*, *Apium graveolens*, and *Plantago coronopus*, but best of all *Alopecurus bulbosus* at South-Ferriby on the Foreshore in a ditch on the silt between Barton and Ferriby the hybrid *Equisetum arvense limosum*, has been once taken; and should again be looked for.

Diatoms—Mr. R. H. Philip writes:—Some interesting forms will be found in the "Blow Hole" (Barton Springs). I have found there *Campylodiscus hibernicus*, *Cyclotella comta*, *Navicula Iridis*, *Pinnularia major*, *Pleurosigma attenuatum*, *Surirella biseriata*, *S. robusta* var. *splendida*, *S. spiralis* and *Synedra amphicephala*. The tidal pools on the Humber shore should be examined for brackish water forms.

ENTOMOLOGY.—The Entomological Section will be officially represented by Mr. G. W. Mason.

Lepidoptera—Mr. G. W. Mason writes:—Among the species which have been taken at Sugar, and which are likely to occur at this time of the year, are *Thyatira derasa*, *Leucania conigera*, *Neuria reticulata*, *Cerigo matura*, *Apamea unanimis*, *Mania maura*, *Hadena dissimilis*, *Chariclea umbra*, etc. Larvae of *Cucullia verbasci*, are generally common, and *Triphaena interjecta* may be seen near the Blow Wells in the late afternoon or evening. *Platyptilia gonodactyla* is abundant among Coltsfoot, *Eupœcilia roseana*, among teasel with occasional *Penthina gentiana*, and *Orthotelia sparganella* has been bred freely from *Sparganium ramosum*.

ARACHNOLOGY.—The Yorkshire Arachnida Committee will be represented by Messrs T. Stainforth, B.A., and E. A. Parsons.

Mr. Stainforth writes:—The Humber shore offers exceptional facilities for the collecting of uncommon Arachnida. The first British specimens of *Cornicularia kochii* were obtained in this neighbourhood. Amongst other species collected on the Humber shore are the following:—*Tmeticus huthwaitii T. bicolor*, *Gongylidium dentatum*, *G. rufipes*, *G. retusum G. gibbosum*, *Erigone dentipalpis*, *Cnephalocotes curtus*, *Walckenœra acuminata*, *Dicymbium nigrum*, *Lophomma herbigradum*, *Bathyphantes approximatus* and *Micariosoma festivum*. Search should be made for *Lycosa purbeckensis*, var. *minor*, of which a specimen has been taken at Cleethorpes, and numerous specimens at various points on the Yorkshire shore of the Humber.

PROGRAMME OF MEETINGS.—

4-0 p.m.—Tea, 1/6 per head
4-45 p.m.—Sectional Meetings } at the George Hotel.
4-50 p.m.—General Meeting

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before June 12th, to the Secretary of the Y.N.U., the Museum, Hull.

Yorkshire Naturalists' Union.

THE 232ND MEETING

WILL BE HELD AT

INGLETON,

For KINGSDALE and GREYGARTH.

ON

August Bank Holiday week-end,

August 5th to 7th, 1911.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland and N.E. Railways, which have booking arrangements for INGLETON, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Tickets taken on Friday to Monday, August 4th to 7th, will be available for return on August 7th and 8th. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by the Secretary of the Union. Members and Associates wishing for this Certificate must apply to Mr. Sheppard for it. At Stations on the N.E. and H. & B. Railways tickets at the reduced fares will be issued on production of the signed card of membership.

CONVEYANCES may be obtained at the Ingleborough Hotel or at Kingsdale Head.

TRAIN TIMES:—Trains from the South are due to reach Ingleton at 8-25, 10-2, 11-25 a.m. and 12-45 p m.
Depart South 6-35 and 7-35 p.m.

BOOKS AND MAPS.—The whole area is included in Sheet 50 (=97 S.W.) of the One-Inch Ordnance Map, which may be obtained geologically coloured.

For information concerning the geology, and fauna and flora of the district, see Y.N.U. Circular, number 193.

Prof. T. Mc. K. Hughes' papers in Vols. 14-16 of the Yorkshire Geological Proceedings on the geology and stratigraphy of Ingleborough may be referred to. Mr. Speight's work on Craven and the North West Yorkshire Highlands contains chapters on the Swallow Holes of Greygarth and on the geology and botany of the district; and so does Mr. Balderson's work, "Ingleton, Bygone and Present." Phillips' "Geology of Yorkshire," vol. 2; and the Guide to the Model of Ingleborough, recently issued by H.M. Geological Survey Office. Davis and Lees' "West Yorkshire" contain useful information.

THE DISTRICT to be investigated comprises the secluded valley of Kingsdale, the high land in the North towards Dent, and Greygarth (2,250 feet). Though nominally arranged for North-West Yorkshire, the excursion is entirely in the division of Mid-West Yorkshire, to which all records of locality are to be credited.

Bradford Naturalists' Society.—The Ingleton area is within this Society's area of investigation: all records are acceptable by the Society for their record books, and notes may be sent to Mr. J. Beanland, Church Institute, Bradford. Possibly the Society will be represented.

HEADQUARTERS.—The headquarters during the meeting will be at the Ingleborough Hotel, Ingleton.

Accommodation.—For those staying the week-end the terms are 6/- per day for bed, breakfast, dinner and attendance, either at the Ingleborough Hotel (Mr. Fisher) or at Mrs. Stinger's Private Hotel near the station. The existing accommodation is very limited, especially at the Ingleborough Hotel, where many rooms are already booked. Both Mr. Fisher and Mrs. Stinger will kindly secure rooms in cases of inability to provide at either hotel.

EVENING MEETING.—Mr. Cosmo Johns, F.G.S., the President of the Geological Section, has kindly promised to give an address on the geology of the district on Saturday evening.

ROUTES.—Members on arrival, on Saturday, of the train due at Ingleton at 10-2 a.m. from Skipton and the South, will proceed via Dale Beck to Keld Head and thence to Yordas Cave at the head of Kingsdale. After visiting the cave, the owner of Kingsdale Head Farm House kindly invites members to tea before or after exploring the numerous woods and watercourses (in the Yoredales) near to.

The return will be along the Scars of Greygarth, calling at the Gingling and Rowting Pot Holes (dangerous and easily overlooked in hazy weather or fog: Rowting Hole is some 600 feet deep), and thence via Thorn on Force to Ingleton, where the last train leaves for the South at 7-35 p.m. Tea and sectional meetings at 6 p.m.

The excursion for Monday will be arranged by Members staying the week-end.

Suggested Shorter Route.—For late arrivals.—Cross the Bridge and enter Mealbank Quarry at the limekiln end—note the lenticular coal seam—coming out at the top end of the Quarry; continue up the stream through the gorge with the waterfalls to beyond Beasley, and cross the river by the little footbridge just beyond the "Granite Quarry." Visit the Quarry. Return by the road until the waterworks enclosure is reached Go up behind to small quarry for fossils indicative of lowest fauna found in the Ingleton district in Carboniferous rocks. Return to Ingleton from there along the basement beds on the Common.

PERMISSION to visit their properties has been kindly granted by J. G. Robinson, Esq., and other landowners.

N.B.—The Members of the Union are reminded that the grouse season is near and are requested to keep away from the heather as much as possible; also to keep outside the wired-in rabbit warrens. There will probably be shooters in the valley at the time of the visit.

GEOLOGY.—The Geological Section will be officially represented by Mr. A. Harker, M.A., F.R.S., Mr. Cosmo Johns, F.G.S, and Mr. E. Hawksworth.

Mr. W. Robinson writes:—Whatever may have been the origin of the lonely and almost houseless Kingsdale Valley—the road through which rises both ways—it is not due to any folding of strata or other irregularity of the earth's surface. It lies almost flat on the strike of the rocks and is independent of geological structure, there being an absence of any synclinal depression or anticlinal weakness so frequently the cause of valley formation. But be the origin what it may, there is marked evidence that lacustrine conditions followed the oncoming of the glacial period, when vast masses of loose unstratified materials were piled up at the outlet of the valley and ponded back the watercourses and rainfall. It was not till a comparatively recent period, geologically speaking, that the pent-up waters were able to cut through and escape the barrier thus produced.

As it now exists, this almost desolate, though wildly beautiful valley, may be described as a broad alluvial flat with many lagoon-like pools, surrounded, except at the outlet, by the precipitous slopes of Whernside and Greygarth.

The old drainage courses which lazily wandered over the valley in every direction are still very visible.

The glacier responsible for these conditions, moved from north or north-east to the south and south-west as is evidenced by ice scratches, by drumlins, and by the many perched rocks deposited and left behind during its retreat.

The solid geology consists of the Great Scar Limestone (in which the valley is excavated) resting on upturned pre-Carboniferous slate rocks. The fossiliferous Yoredales above the great scar may be well seen in the Gills at the head of the valley, and the millstone grits higher up.

The dip of the rocks to the north is very noticeable and may suggest that lacustrine conditions prevailed prior to the ice age.

The famous Yordas Cave, the Swallow Holes (Gingling pot has a sheer descent of 53 yards), Rowton or Rowantree Hole mentioned above, and the perched blocks are worth a long journey to see.

BOTANY.—The Botanical Section will be officially represented.

Flowering Plants.—Kingsdale, which ranges from 850 to 1,000 feet above sea level, does not appear to have received special attention. The alluvial soil, the woods, the old watercourses, the lagoons and rocky gills should form congenial hunting grounds.

Mosses and Hepatics—The Yorkshire Bryological Committee will be officially represented by the Chairman, Mr. W. Ingham, B.A.

Mr. Ingham writes:—Ingleton is an excellent centre for the bryologist, and a long list of rare and interesting mosses and hepatics could be supplied for this rich district. It must suffice for this circular to indicate the rare plants that have been found during the last few years, the majority due to the good work carried out there by Mr. C. A. Cheetham and Mr. F. Haxby.

Hepatics. The rare *Riccia lescuriana* and *Anthelia julacea* on Ingleboro'. Special attention should be given to this class of plants.

Sphagna. *S. Acutifolium* var. *fusco-glaucescens*, *S. subnitens* var. *obscurum*, and *S. papillosum* var. *normale* There are few records of Sphagna named according to the new Warnstorfian system.

True Mosses. *Swartzia montana*, *Mnium orthorrynchum*, and *Hypnum incurvatum* at Chapel-le-Dale; *Seligeria doniana* in Wethercote Cave; *Cylindrothecium concinnum* grows at Clapham and may occur at other places near Ingleton.

The following interesting mosses grow on Ingleboro', and it will be useful work to note their extension to other places in the district:—*Andreaea alpina*, *Diphyscium foliosum* var. *acutifolium*, *Rhabdoweisia denticulata*, *Brachyodus trichodes*, *Campylopus flexuosus* var *uliginosus*, *Dicranum scoparium* var. *spadiceum*, *Grimmia torquata*, *Rhacomitrium heterostichum* var. *alopecurum*, *Trichostomum mutabile* var. *cophocarpum*, *Anœctangium compactum*, *Zygodon lapponicus*, *Tetraplodon mnioides*, *Hypnum fluitans* var. *gracile*, *H. giganteum*, and *H. sarmentosum* var. *fallaciosum*.

Fungi.—The Yorkshire Mycological Committee will be officially represented by Mr. M. Malone.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will be officially represented.

Mammalia. } There does not appear to be any report at
Reptiles and Amphibia. } present on this district.

Birds—Dippers are not uncommon. Grey Wagtails breed at the north end of the Valley. Mr. H. B. Booth, M.B.O.U., reported some time ago that Merlins nested on the slopes of Ingleborough.

Mr. W. H. Parkin writes that the Peregrine Falcon, Brown Owl, Long-eared Owl, Grasshopper Warbler, Whinchat, Wheatear, Reed Bunting, Curlew, Redshank, Kingfisher, and most of the moorland birds occur. The Stonechat is supposed to breed here and a good look-out for the bird should be kept.

CONCHOLOGY.—The Conchological Section will be officially represented by Mr. F. Booth, Mr. W. Cash, and Mr A. J. Moore.

Land and Freshwater Mollusca—Mr. Booth writes:—Ingleton is well known to most conchologists as a very productive district. The marshy places near the entrance of the Swilla Glen yield *Pupa anglica* and *Vertigo antivertigo*, and amongst the vegetation on the hillside near *Hygromia fusca* occurs.

The slopes of the wood on the left hand, after descending the flight of steps, is a very rich hunting ground, and the following species may be mentioned amongst others:—*Euconulus fulvus*, *Acanthinula aculeata*, *Acicula lineata*, *Vertigo substriata*, *V. pusilla*, *Clausilia laminata*, etc. The ledges along some of the cliffs near the top of Constitution Hill yield *Pupa secale*. The same species occurs again at Twisleton Scars. *Ancylus lacustris* and its variety *albida* occur in the stream. The damp woody part on the right hand of the stream going up the valley, yield very fine *Hyalina cellaria* and *Hy. helvetica*, whilst some marshy ground on the slopes nearing Pecca Falls yield *Succinea putris* and *S. elegans*.

The Beesley Valley, while not being so productive as the Swilla Valley, produces one of our rare Yorkshire shells, *Vertigo alpestris*, which occurs on a low wall near the lower end. The wall tops throughout the district are also productive, under suitable conditions, for *Pyramidula rupestris*, *Clausilia bidentata* var. *cravenensis* and *Balea perversa*. Many of the roadsides yield the larger *Helices* in abundance under moist conditions. *Helix aspersa* occurs on several garden walls in the village

In regard to slugs, *Limax arborum* is very common, hiding away in cracks and holes in trees in Swilla Glen; and although full early for *Limax tenellus* to occur in adult form, this species has yet to be turned up in this part of Yorkshire, so a diligent search may add this slug to the district list, though they will no doubt be juvenile specimens.

ENTOMOLOGY.—The Entomological Section will be officially represented.

Coleoptera.—The Yorkshire Coleoptera Committee will be officially represented by Mr. J. W. Carter, F.E.S.

Mr. E. G. Bayford, F.E.S., writes:—Our knowledge of the beetle fauna of the Ingleton district is mostly due to the researches of the late G. W. Chaster and J. W. Ellis, with additions by F. Booth, J. W. Carter, F.E.S., and the writer. On the occasion of the previous visit of the Union, May 12-14, 1906, there was nothing of importance taken so far as this order is concerned. To quote Mr. Carter's words, "the species noted were what one would expect to find in almost any part of the country."

The following is a list of the best species recorded, those marked with an * being the only records for the county:—**Ischnoglossa prolixa*, Gr., *Autalia rivularis*, Gr, *Sipalia ruficollis*, Er., *Bolitocharia lucida*. Gr., *B. obliqua*, Er., *Othius myrmecophilus*, Kies, *Lathrobium multipunctum*, Gr., *Trogophlaeus arcuatus*, Steph., *T. corticinus*. Gr., *Geodromicus plagiatus*, Heer var. *nigrita*, Mull., *Lathrimaum unicolor*, Steph., *Homalium vile*, Er., *Choleva wilkini*, Spence, **Bythinus validus*, Aube, *B securiger*, Reich, *B. burrelli*, Denny, *Corymbites cupreus*, F. var. *aeruginosus*, F., **Cis festivus*, Panz, Clapham. *Gracilia minuta*, F., Clapham, **Haltica palustris*, Weise, **Aphthona herbigrada*, Curt. var. *laevicollis*, Rey., *Mniophila muscorum*, Koch, *Apion seminulum*, Kirby, *Otiorhynchus rugifrons*, Gyll.

ARACHNOLOGY.—The Yorkshire Arachnida Committee will be represented.

Mr. W. Falconer writes:—The Ingleton district has not yet been properly worked, although various collectors have paid passing visits to the locality. A number of common species are on record, with a few of greater rarity and interest, such as *Argyroneta aquatica* Latr., *Leptyphantes angulatus* Cb., *Tmeticus prudens*, *expertus* and *rivalis* Cb., *Caledonia evansi* Camb., *Meta menardi* (in caves), and *Pirata hygrophilus* Thor. The dales with their relatively greater wealth of vegetation and moist places on the higher ground, will be the most productive spots to work at this season. It may be that *Neriene montana*, one of Blackwall's lost species, will reward the diligent collector.

PROGRAMME OF MEETINGS.—

6-0 p.m.—Tea, 1/6 per head
6-30 p.m.—Sectional Meetings } at the Ingleborough Hotel.
7-0 p.m.—General Meeting

Trains depart South at 6-35 and 7-35 p.m.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before August 18th, to the Secretary of the Y.N.U., the Museum, Hull.

Yorkshire Naturalists' Union.

President:
ALFRED HARKER, M.A., F.R.S., Cambridge.

Hon. Secretary:
T. SHEPPARD, F.G.S., Municipal Museums, Hull.

Local Secretary:
W. E. L. WATTAM, 30 Towngate, Newsome, near Huddersfield.

THE 233RD MEETING

WILL BE HELD AT

HARDEN MOSS,

NEAR MELTHAM, (S.W. Yorks.),

For the investigation of the adjacent Woods and Moors,

ON

Saturday, September 9th, 1911.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland and N.E. Railways, which have booking arrangements for Meltham to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Tickets taken on Friday or Saturday, September 8th and 9th, will be available for return on September 9th to 11th. Where through bookings are not in operation, members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by the Secretary of the Union. Members and Associates wishing for this Certificate must apply to Mr. Sheppard for it. At Stations on the N.E. and H. & B. Railways tickets at the reduced fares will be issued on production of the signed card of membership.

TRAINS FOR HUDDERSFIELD leave Halifax (L. & Y.) 8 43 a.m.; Bradford (L. & Y.) 8-40 a.m.; Leeds (L. & N. W.) 9-0 a.m. Arrivals by these trains will be met at Huddersfield Station, and the party will then travel by the 9-50 L. & Y. train to Meltham. Later arrivals will leave Huddersfield by the 1-12 p.m. train to Meltham. Members unable to obtain through tickets should book to Huddersfield, then rebook to Meltham, or in the case of the Geologists, to Healey House.

ROUTES.— 1. The party leaving Huddersfield for Meltham by the 9-50 a.m. train, and including the general body of Naturalists, will proceed to Thick Hollins Moor, thence to Harden Clough and Harden Moss Woods. Leaders, Mr. W. Falconer and Mr. B. Morley.

2. Later arrivals will leave Huddersfield by the 1-12 p m. train. Leaders, Mr. G. T. Porritt, F.L.S., F.E.S., and Mr. W. E. L. Wattam.

3. Geologists proceed by 9-50 train to Healey House Station: thence, via Hall Hey Wood to the Fault at Dolly Folly, then across the Meltham Valley to Houley Old Wood, over the Millstone Grit Plateau to Wilshaw: thence, via Thick Hollins to Harden Moss. Leader, Dr. T. W. Woodhead, F.L.S.

BOOKS AND MAPS.—The area for investigation is included in Sheet 88 of the One Inch Ordnance Map, which may be had geologically coloured. Annotated lists of the fauna and flora, as complete as possible up to date of publication, are contained in Hobkirk's "History and Natural History of Huddersfield." Later catalogues of the Lepidoptera (Porritt and Mosley), Mollusca (Whitwham), &c., have appeared in the "Trans. of the Huddersfield Nat. Soc." A catalogue of the larger Fungi (Clarke) was issued by the Botanical Society. There is a small pamphlet on the vertebrates (Mosley) enumerating all the species. The ecology of the area for investigation is dealt with in the "Ecology of Woodland Plants in the Neighbourhood of Huddersfield" (Dr. T. W. Woodhead, F.L.S.), and in the "Geographical Distribution of Vegetation in Yorkshire, Leeds and Halifax District" (Smith and Moss).

HEADQUARTERS.—Wood Cottage Hotel, Harden Moss, near Holmfirth.

PERMISSION to visit their properties has been kindly granted by Messrs. Jonas Brook & Bros., Ltd., and Mr. George Hinchliffe.

HARDEN CLOUGH AND WOODS.—Mr. W. E. L. Wattam writes:—Harden Clough is the largest valley within the Meltham area of the Holme Valley drainage. The stream running through it arises on the moors in the vicinity of Harden Moss Farm at an altitude of 1,200 feet, its confluence with the river Holme being at Steps, Honley. The Clough is a well-wooded picturesque valley commencing at Royd Edge, Meltham, emerging on to the moorland known as Harden Moss; at which point, to the north, south and west, as far as the eye can reach, is one great stretch of moorland hills with deep intervening valleys. To the east we look upon the limit of cultivation. The higher moors, rising to 1,909 feet at Black Hill, are covered with deep peat, through which numerous streams have cut their way. Immense areas are dominated by the cotton grasses with much birch buried at the base of the peat. The lower plateaux have a covering of shallow dry peat dominated by *Calluna* and its associates. At the base of the Clough the wood is of a mixed type, *Quercus sessiliflora*, *Ulmus Montana*, and a sprinkling of *Pinus sylvestris* and *Larix europæa*. Higher up the valley, just before entering upon the moor, is a small wood consisting almost entirely of birch. Harden Wood is also a *Quercus sessiliflora* wood with a considerable admixture of planted trees. The eastern portion of Thick Hollins Moor is a typical *Calluna* heath; the western portion, forming the banks of Snape Clough, is a grass heath with a considerable variety of typical moorland species.

GEOLOGY.—The Geological section will be officially represented.

The rocks in the area to be investigated all belong to the Millstone Grit series, and may be divided into four distinct groups of sandstones and shales. First and uppermost is the rough rock; second, thin beds of Flagstones immediately beneath rough rock; third, three beds of Sandstone, usually known as the Third Grits; and fourth, the Kinder Scout Grit. Some of the beds have been quarried and casts of *Sigillaria* and *Stigmaria* are fairly common.

The route chosen will illustrate the characteristic features of the Millstone Grits and show the relationship between geology and vegetation. From the top of Honley Moor a fine view of the plateau is obtained, also the grit capped peaks of West Nab and Shooters' Nab at either end of a synclinal hill. The junction between the Grits and Lower Coal Measures and the accompanying physiographical changes are also well seen.

CONCHOLOGY.—The Conchological Section will be officially represented.

BOTANY.—This section will be officially represented by Dr. T. W. Woodhead, F. L. S., who writes:—

Flowering Plants.—The woods of the area are typically those of *Quercus sessiliflora*, with much planted Beech, Elm and Conifers in places. Birch is

common in the higher parts, a mere relic of a much more extensive forest zone of which there are abundant remains at the base of the peat on the high, now treeless, moorlands. Both *Betula verrucosa* and *B. pubescens* occur as well as hybrids. The district, though not rich botanically, should yield several interesting varieties, and the following should be searched for:—The hairy variety of *Viola palustris*, *Montia lamprosperma*, *Calluna vulgaris* var. *hirkai* and also the hairy form. *Juncus effusus* with condensed *inflorescences* (often mis-called *J. conglomeratus*) is common, and *Melampyrum pratense* var. *hians* The district also contains many good *Rubi*. Other species occuring here are *Ranunculus lenormandi*, *Genista anglica*, *Ulex Gallii*, *Hydrocotyle*, *Valeriana dioica*, *Hieracium sciaphilum*, *H. boreale*, *Crepis paludosa*, *Vaccinium vitis idæa*, *V. oxycoccus*, *Empetrum*, *Carex binervis*, *C. lævigata*, *C. pilulifera*, *Lastræa oreopteris*, *Polypodium Phegopteris* and *Equisetum sylvaticum*.

Mosses.—Mr. W. E. L. Wattam writes:—The following are the more interesting mosses to be met with in this district:—*Sphagnum acutifolium*, *S. squarrosum*, *S intermedium*, *S. subsecundum*, *Dichodontium pellucidum*, *Dicranella squarrosa*, *Thaseum bryoides*, *Didymodon rubellus*, *Racomitrium heterostichum*, *Philonotis fontana*, *Bryum pseudo-triquetrum*, *Tetrodontium brownianum*, *Hyocomium flagellare*, *Hypnum vernicosum*, *H. ochraceum*, *Hylocomium loreum* and *H. squarrosum*.

Lichens.—Only the common species occur: *Cladonia digitata*, *C. squamosa*, *C. pyxidata*, *Parmelia saxatilis* and *Lecidia contigua*.

Fungi —Mr. Alfred Clark writes:—Harden Clough and the woods in the vicinity have always provided a good supply of specimens. *Amanita muscaria*, *Am. rubescens* and their allies being usually plentiful in the autumn. The beautiful yellow-gilled *Tricholoma rutilans* has usually been found, *Lactariae* and *Russulae* abound in a good season, *Polyporae* and *Boletæ* are common, *Boletus parasiticus* on *Scleroderma* should be looked for. It is the only district in the neighbourhood of Hudderfield that has yielded the "Hedgehog" Mushroom *(Hydnum repandum)*.

On the damp banks of the stream which runs down the Clough, many interesting microscopic species may be found, also some species of *Myxomycetes*.

The Botanical Survey Committee will be officially represented by Dr. T. W. Woodhead, F.L.S.

Route No. 3 affords an opportunity of examining an interesting portion of the Moorland Plant Associations of the Huddersfield District.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will be officially represented.

Birds.—Mr. Charles Mosley writes:—I cannot claim to have paid especial attention to the air fauna of Harden Clough, neither am I aware of any published records from this locality, hence cannot buoy up the ornithologists with a promise of "good things," except such a promise as necessarily accompanies the working of more-or-less virgin ground. Common species, such as Missel Thrush, Song Thrush, Blackbird, Blue Tit, Chaffinch, Starling, Robin, Wren, Meadow Pipit, Skylark and others obviously occur. The stream which runs down the Clough is a resort of the Pied Wagtail, and the Wheatear frequents the rough slopes. In that portion of the Clough that is wooded, Magpies occasionally nest, and one has here, too, heard the Nightjar. Red Grouse occur on the moors above the Clough, and the Redwing and Fieldfare come in due season.

Fish.—The Trout occurs in the Clough stream.

Mammalia.—Mrs. L. Mosley, F.E.S., writes:—The Field Vole and Wood Mouse are not uncommon, and I have seen the Shrew in the lower part of the Clough. The Water Shrew occurs in the district, but I have not yet seen it in this particular locality. The Weasel and the Stoat both occur, the latter chiefly on the higher parts.

Reptiles.—Mrs. L. Mosley, F.E.S., writes:—Of reptiles I only know of the Common Lizard, which is not unfrequent on the moors.

ENTOMOLOGY,—The Entomological Section will be officially represented by Mr. G. T. Porritt, F.L.S., F.E.S.

Lepidoptera.—Mr. Porritt writes :—September is too late to expect a large representation of the local Lepidoptera, but still several interesting species should be found. *Oporabia filigrammaria* is often abundant in the woods all around the place of meeting, and the date should be right for it. *Cloantha solidaginis* is equally plentiful a little earlier, and will probably still be found on the walls, pine trunks, etc., in the daytime, although both are best found by searching the heather and bilberry with a lamp after dark. *Cælæna haworthii* flies freely among the cotton grass. Larva of *Acronycta menyanthidis* will probably be still feeding on heather and bilberry, and those of *Hadena glauca* and *H. pisi* on various moorland plants. The elm trees in the wood along Harden Clough should produce plenty of larvæ of *Abraxas ulmata*, and the pine trees those of *Fidonia piniaria* equally freely. Those who can remain to sugar at night would probably be delighted with the abundance and rich variety of *Anchocelis rufina*, among which a sprinkling of *Agrotis saucia*, *Noctua glareosa*, *Cloantha solidaginis*, late *Orthosia suspecta* and many others might be expected.

Coleoptera.—Mrs. L. Mosley writes :—In Harden Clough I have taken *Dryocœtes alni* plentifully, under bark of alder. *Trypodendron domesticum* has also been taken boring into birch, while *Hylurgus piniperda* is plentiful on fir. *Hylobius abietis* may also be beaten from fir. Under loose bark, *Anchomenus junceus* is not uncommon, and *Nebria gyllenhalii* among loose stones. On the moor at the top I have taken *Bradycellus cognatus*, *B. similis*, *Trechus minutus*, *Harpalus latus*, *Pterostrichus vitreus* and many commoner species under stones. *Cicindela campestris* and *Carabus arvensis* may be looked for; they have not actually been taken here, but have occurred in the district The Beetles of this locality have never been properly worked, and many species not at present known may turn up.

ARACHNOLOGY.—The Yorkshire Arachnida Committee will be represented by Mr. Wm. Falconer, who writes :—

Arachnida.—Though the Huddersfield district is one of the few in Yorkshire which has been worked at all seasons for many years, the total of its arachnidal population, 184 species of spiders, 13 harvestmen and 4 pseudo-scorpions, is not an exceptional one. This may be partly accounted for by the nature of the district, many of the larger and more conspicuous spiders which frequent areas where the vegetation is more varied and luxuriant, being absent. On the other hand, the grass and other herbage of the little cloughs and the boggy ground on the moors shelter an abundance of the smaller kinds, many of which, as British species, are rare. Of these, Huddersfield is the only Yorkshire station for *Scotina celans*, Bl , *Porrhomma egeria*, Sim., *Gongylidiellum latebricola*, Camb., *Maro falconerii*, Jacks., *Leboria caliginosa*, Falcr., *Wideria fugax*, Camb., *Tigellinus furcillatus*, Menge, *Diplocephalus protuberans*, Camb , *Centromerus serratus*, Camb. (the only Br. record), and *Maro minutus*, Camb (the only world record), while *Phaulothrix hardii*, Bl , *Tmeticus firmus*, Camb., *Gongylidiellum paganum*, Sim., *Tapinocyba insecta*, Koch., *Hahnia helveola*, Sim , *Onesinda minutissima*, Camb., *Centromerus arcanus*, Camb. and *Diplocentria rivalis*, Camb., are exceedingly rare in any other part of the county.

PROGRAMME OF MEETINGS.

5-0 p.m.—Meat Tea, 1/6 per head
5-45 p.m.—Sectional Meetings
6-0 p.m.—General Meeting
} All at Wood Cottage Hotel.

8-3, 8-50 and 9 15 p.m.—Trains leave Holmfirth for Huddersfield.

7-20, 8 45 p.m.—Trains leave Meltham for Huddersfield.

The Wood Cottage Hotel is about the same distance from Meltham and Holmfirth

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded, before Sept. 16th, to the Secretary of the Y.N.U., the Museum, Hull.

THE 234TH MEETING

WILL BE HELD AT

SANDSEND,

(Near Whitby),

FOR A

Fungus Foray in Mulgrave Woods

AND ADJOINING DISTRICT,

From Saturday, September 23rd to 28th., 1911.

Chairman of Mycological Committee
GEORGE MASSEE, V.M.H. etc., of the Royal Herbarum, Kew.

Hon. Secretary, Mycological Committee;
CHAS. CROSSLAND, 4 Coleridge Street, Halifax.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland, and N.E. Railways, which have booking arrangements for SANDSEND, to Members and Associates of the Y.N.U., surrendering the Certificate noted below. Tickets will be available for the outward journey from the 22nd to the 28th September, inclusive, and for return up to, and including the 29th September. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fare being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by the Secretary of the Union. Members and Associates wishing for this Certificate must apply to Mr. Sheppard for it. At Stations on the N.E. Rly. and H. & B. Rly. tickets at the reduced fares will be issued on production of the signed card of membership.

PERMISSION to pay a fourth visit to the majestic Mulgrave Woods has been granted by the Rev. the Marquis of Normanby. Last year it was considered advisable to continue the investigation of these marvellous woods for another season and then summarise the Mycological work done in the woods and neighbouring fields by our Committee.

HEADQUARTERS are at Mrs. T. Kidd's, Normanby House, Sandsend. Members must write direct to Mrs. Kidd to secure accommodation. The Work Rooms at the School close by, on Monday, Tuesday and Wednesday.

ROUTES will be set out each morning.

PAPERS will be read, and Talks given as follow :—

SATURDAY EVENING.—Mr. R. H. Philip, Hull, will read a paper entitled "Notes on the Uredinaceae." Mr. J. W. H. Johnson will read a paper on "Fungi found in sewage-polluted West Riding streams, and in other places."

MONDAY EVENING.—Mr. Massee will lecture on "Diseases of Plants Caused by Fungi." This Meeting will be held in the large schoolroom at Mulgrave Castle by invitation of Lord Normanby, who has kindly promised to preside. The lecture is intended for the special benefit of local farmers, woodmen, cottage gardeners, etc., and will be illustrated by the lantern.

TUESDAY EVENING.—Mr. Massee will give a Talk on Mycological celebrities from early times onwards, illustrated by the lantern.

WEDNESDAY EVENING.—Summary of work done in this district by the Mycological Committee during its several visits under the auspices of the Union, and on informal occasions by C. Crossland.

BUSINESS MEETING 8-30.

Mycologists are requested to bring their books, microscopes, etc. Messrs. Clarke and Crossland will have each a series of coloured drawings for inspection. Mr. W. N. Cheesman will have a series of Mycœtozoa mounted for the microscope, and Mr. A. E. Peck a number of photographs, and lantern slides of Fungi.

Yorkshire Marine Biology Committee.

Chairman: Prof. W. Garstang, M.A., F.Z.S., Leeds.
Convener: Rev. F. H. Woods, B.D., Bainton, Driffield.

A MEETING

Of the Marine Biology Committee will be held at

SCARBOROUGH

From Friday, September 22nd, to Tuesday, September 26th, 1911.

Headquarters: Matthew's Boarding House, Scarborough.

In the daytime, excursions, to be arranged at headquarters, will be taken in search of forms of marine life, and each evening there will be discussions on the specimens collected. It is hoped that a series of lectures can be arranged.

ACCOMMODATION :—Suitable accommodation can be secured at Matthew's Boarding House. Terms, 6/- per day. Members desiring accommodation should communicate with the Convener, the Rev. F. H. Woods, B.D., Bainton, Driffield.

Scarborough is an excellent centre for Marine Biology.

RAILWAY FACILITIES :—Cheap Excursion Tickets to Scarborough are issued from all parts of Yorkshire.

A short account of the Marine Biology of Scarborough by Dr. Irving will be found in *The Naturalist* for September. It may be added that Scarborough is extremely rich in microscopic mollusca. Great numbers of the empty shells are washed up on the sands; but it is very important to discover as far as possible the habitat of the living animals.

Among the rarer and most interesting molluscs may be mentioned :—

Nuculana minuta.
Modiolaria marmorata.
Palliolum tigerinum.
Lima subauriculata.
Montacuta substriata.
Lasæa rubra.
Tapes virgineus.
Dentalium entale.
Lacuna parva.
Rissoa inconspicua.
Cingula trifasciata.
Capulus hungaricus.
Actis ascaris.
A. minor.
Pyrgulina indistincta.
P. interstincta.
Ondina obliqua.
Turbonilla lactea.
Eulimella nitidissima.
Bela rufa.
Hædropleura costata.
Clathurella linearis.
Actæon tornatilis.
Tornatina obtusa.
Philina scabra.
P. punctata.
P. catena.
Limacina retroversa.
Leuconia bidentata.

Some of these are deep sea molluscs, which are only washed up in their young state.

The Committee would be glad to welcome all who are interested in any branch of Marine Biology.

CIRCULAR 235).

Yorkshire Naturalists' Union.

President:

ALFRED HARKER, M.A., F.R.S., Cambridge.

Ex-Presidents:

Rev. Wm. Fowler, M.A., Liversedge.
John Gilbert Baker, F.R.S., F.L.S., Kew.
Rt. Hon. Lord Walsingham, M.A., F.R.S., Thetford, Norfolk.
Sir Ralph Payne Gallwey, Bart., M.B.O.U., Thirkleby Park.
Henry Eeles Dresser, F.L.S., F.Z.S., London.
R. H. Tiddeman, M.A., F.G.S., Oxford.
Robert Braithwaite, M.D., F.L.S., London.
Prof. W. Boyd Dawkins, M.A., F.R.S., Manchester.
William West, F.L.S., Bradford.
George T. Porritt, F.L.S., F.E.S., Huddersfield.
Prof. Percy F. Kendall, M.Sc., F.G.S., Leeds.
W. Denison Roebuck, F.L.S., Leeds.
A. H. Pawson, J.P., F.L.S., F.G.S., London.
G. W. Lamplugh, F.R.S., F.G.S., London.
W. Eagle Clarke, F.R.S.E., Edinburgh.
Charles Crossland, F.L.S., Halifax.
Dr. Wheelton Hind, B.Sc., F.G.S., Stoke-on-Trent.
W. H. St. Quintin, F.Z.S. Scampston, York.
Prof. A. C. Seward, M.A., F.R.S., etc.

Hon. Secretary:

T. SHEPPARD, F.G.S., Municipal Museums, Hull.

THE 235TH MEETING

AND

50th ANNUAL MEETING,

WILL BE HELD AT

HECKMONDWIKE

(Preceded by an EXCURSION to NORTHORPE),

for the investigation of the Coal Measures of Spen Valley,

ON

Saturday, Dec. 16th, 1911.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland & N.E. Railways, which have booking arrangements for Heckmondwike, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. The Tickets will be issued on Friday, the 15th, and Saturday, the 16th December, and will be available for returning on Saturday, 16th, and up to and including the Monday, December 18th, 1911. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

At Stations on the North Eastern Railway, Saturday and Week-end Tickets will be issued at single fares for the double journey (minimum, 2/- Third Class). Similar Tickets are issued from many Stations on other Companies' lines.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by the Secretary of the Union. Members and Associates wishing for this Certificate must apply to Mr. Sheppard for it. At Stations on the N.E. and H. & B. Railways, tickets at the reduced fares will be issued on production of the signed card of membership.

PROGRAMME.

10-59 a.m.

A party of Geologists under the guidance of Mr. R. Renton, will leave Heckmondwike, L. & Y. Station at 10-59 a.m. for Dark Lane Colliery, Northorpe, where Mr. John Nevin, J.P., F.G.S., Past President of the Midland Institute of Mining Engineers, the owner of three pits in the Mirfield district, has generously promised to have on view coloured sections of the pits, and also of a borehole from the Lowmoor Black Bed to the Millstone Grit. This hole passed through a fault, and missed the Halifax Beds. Fossils from the pits will also be shown, and if any members care to go down the Dark Lane Pit arrangements will be made. The nearest working places are about 500 yards from the shaft. The mine is reported to be particularly rich in fossil plants. One of the three pits is worked for the fireclay underlying the Halifax Hard Bed. The Return Train leaves Northorpe at 12-36 p.m. The time is therefore limited, and it is advisable for all who intend to participate, to be present at the Heckmondwike L. & Y. Station not later than 10-50 a.m,

Forster Hall, Heckmondwike.

Those who cannot make it convenient to attend the above Excursion will find much to interest them in the Exhibition at the Forster Hall.

1=0 p.m. to 2=30 p.m.—Luncheon

Will be provided at the Church Schools, in Church Street, Heckmondwike, at 1/6 each for those who give notice to Mr. A. Moore, Peasland Road, Cleckheaton or Mr. G. W. Parker, 23 Vernon Road, Heckmondwike, not later than Wednesday, December 13th. Owing to special difficulties refreshments cannot be guaranteed if this request is not complied with.

The Jubilee Annual Meeting

will be held in Forster Hall, High Street, Heckmondwike, by kind permission of the Governors of the Secondary School. In view of the importance of the occasion a special invitation is extended to all Members and Associates.

2=30 p.m. The Sectional Meetings

(which all Members and Associates are entitled to attend) will be held at the Forster Hall for the election of Officers of Sections, and to receive the Annual Reports from the Secretaries.

3=0 p.m. The General Committee

(each Member of which receives a special invitation with this Circular) will meet to consider the Annual Report, elect Officers, and arrange the Excursion Programme for 1912.

Honorary Member.

In view of his many services to Yorkshire Science, the Executive Committee recommend that Mr. Wm. Cash, of Halifax, be elected an honorary member of the Yorkshire Naturalists' Union.

5=0 p.m. A Meat Tea

at 1/6 each will be served at the Church Schools, in Church Street, Heckmondwike, to those who notify their intention of being present by card to the local Secretaries mentioned above, not later than Wednesday, December 13th.

6-30 p.m. The General Meeting

of Members and Associates will be held at the Forster Hall. The chair will be taken by the President of the Union, who will be supported by prominent members, and as far as possible by the members who formed the Union. After the reading of the Annual Report, the announcement of the Excursion Programme for 1912, and the Election of New Members,

The Presidential Address

will be delivered by Mr. Alfred Harker, M.A., F.R.S., Cambridge; subject "PETROLOGY IN YORKSHIRE." During the delivery of the Address, the Chair will be occupied by Mr. A. T. Nottingham, the President of the Heckmondwike Society.

Cinematograph Exhibition

At the close of the address, a display of Cinematograph films specially prepared by eminent Naturalists will be given at the Forster Hall, by Mr. W. Goodall, the owner of the local Picture Palaces.

Microscopical Exhibition.

From 10-30 a.m. to 6-30 p.m., and at the close of the cinematograph exhibition if time permits, there will be special displays of Microscope slides, illustrations and photo-micrographs by local workers, aided by the staff of the Secondary School.

X-Ray Demonstration

At 5-45 p.m., Mr. R. S. Cahill, F.C.S., the Principal of the Secondary School, has kindly promised to give a demonstration of X-Rays in the Forster Lecture Hall.

General Exhibition

From 10-30 a.m. to 6-30 p.m., and at the close of the Cinematograph Exhibition if time permits, there will be in various parts of the building displays of special Exhibits, including a collection of Prints and Lantern Slides, prepared by the members of the Camera Section of the Literary and Scientific Society, a collection of Scientific and Photographic Apparatus, etc. kindly furnished by Messrs. Reynolds & Branson, Ltd., of Leeds, a number of Cases illustrating Natural History, etc., the Y.N.U. Geological Albums; and Stereoscopic Views of Bird Life, kindly lent by Mr. Riley Fortune, F.Z.S., etc.

Conversazione.

After the Presidential Address, the **Heckmondwike Naturalists' Society** and the **Spen Valley Literary and Scientific Society** invite the Members and Associates of the Union to a Conversazione in the upper rooms of the School. Acceptance of the invitation must be sent to Mr. Moore or Mr. Parker not later than Wednesday, December 13th. Associates intending to be present should apply to Mr. Moore or Mr. Parker, or to their own officials, for invitation cards. During the evening Light Refreshments will be provided. Evening dress optional.

Return Trains.

Leave Heckmondwike (L. & Y. Station) for Bradford at 8-30, 9-23, and 10-45 p.m.; for Halifax at 8-30, 9-23, 9-42, and 10-45 p.m.; for Leeds (via the L. & N. W. Station) at 8-33, 10-33, and 11-28 p.m.; for Huddersfield (via the L. & N. W. Station) at 8 30, 10-7, and 11-31 p.m.; for Huddersfield (via the L. & Y. Station) at 8-38, and 9-45 p.m.; for Wakefield (via the L. & Y. Station) at 8-45, and 9-45 p.m. Frequent Tram Service to Batley and Dewsbury Railway Stations, a 15 minutes run in both cases.

Maps.

To cover the Spen Valley area the following 6-inch Ordnance (Quarter Sheet) Maps are required. Yorkshire (West Riding) Sheets CCXXXII. S.W., N.W., and S.E. CCXXXI. S.E. and N.E. CCXVI. S.E. CCXVII. S.W., N.W., and N.E. These Maps will be on view in the General Exhibition Room, and will be specially coloured to show 25 ft. altitudes O.D.

Election of Additional Members of General Committee.

Voting papers are not sent out this year, but members may vote by postcard addressed to the Secretary, The Museum, Hull, making their choice from the List of Members.

NEW MEMBERS.—A special effort is being made to get a good list of new members for the Heckmondwike Meeting. Towards this the Hon. Secretary would be glad to receive any nominations. The Subscription is 10/6 per annum, and members receive *The Naturalist*, *Transactions*, etc., free. The new volume of *The Naturalist*, commences on January 1st.

This form when filled up and signed, should be sent to the Secretary of the Union, accompanied by the amount of the first year's subscription.

The subscription of 10/6 entitles the members to receive the Union's monthly magazine, "The Naturalist," as well as the "Transactions."

Persons related to and resident in the family of a member are admitted as 5/- members, to enable them to attend excursions, but not receiving the publications.

Qualification for Life Membership:—A Donation of 7 Guineas.

Yorkshire Naturalists' Union.

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[Signature and Titles].

_____

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[Address].

wishes to become a Member of the Yorkshire Naturalists' Union, and will subscribe HALF-A-GUINEA (10/6) *per annum, until the end of the year in which written resignation is given.*

_____

[Signature of Proposer and Seconder]

_____

Elected _____ 191 *at* _____

_____

Chairman's Signature.

[*With the Compliments of the Spen Valley Literary and Scientific Society, and the Heckmondwike Naturalists' Society.*]

Jubilee of the Yorkshire Naturalists' Union.

The occasion which we are now celebrating is of peculiar interest, inasmuch as the Yorkshire Naturalists' Union this year meets in the place where it was originally founded fifty years ago; and the interest is the greater when it is borne in mind that we also celebrate the somewhat obscure beginnings of the Natural History investigation of our County.

The actual beginning was that of Dr. Martin Lister, of York, whose "Historia Animalium Angliæ" of 1678, includes the first systematic accounts of the molluscs, spiders and fossils of our county, and whose proposals for a table of soils was the earliest suggestion of geological maps. After this nothing was done till James Bolton, of Halifax, published his excellent works on Fungi and Ferns, about the close of the eighteenth century.

The later revival, of which our own work is the direct and uninterrupted continuation, is due to the labours of numerous artisan naturalists on both flanks of the Pennine Range of hills, particularly around Manchester on the Western slope, and on the Eastern slope in the neighbourhood of Huddersfield, Halifax, Hebden Bridge, Heckmondwike, Wakefield, Barnsley, and later on as far West as Bradford and Leeds.

Amongst these unobtrusive workers were not a few keen enthusiasts whose labours and sacrifices in the cause of natural science, rendered their careers as worthy of sympathetic biography as any of those who have been immortalized by the pen of Dr. Samuel Smiles; and as he was at one time resident in Leeds and Editor of the "Leeds Times," it is possibly by the merest accident that one or other of these West Riding pioneers did not happen to be one of his subjects.

Of these men we may at random mention such names as Samuel Gibson, of Hebden Bridge, James Varley, John Armitage, John Bartlam, and Joseph Tindall of Huddersfield, Richard Jessop of Lascelles Hall, E. Taylor of Dalton, Caius Cassius Hanson of Greetland, Roger Earnshaw of Ovenden, Thomas Lister of Barnsley, George Roberts of Lofthouse, William Talbot and Joseph Wilcock of Wakefield, William Liversedge, William Nelson and Charles Smethurst of Leeds, as a few of those who made the success of the local societies which sprang up in the towns, villages and hamlets of South west Yorkshire.

Huddersfield was the chief centre and the radiant point, and the foundation of the Huddersfield Naturalists' Society in 1847 gives that town an honourable position in the natural history annals of Yorkshire; and never since has that town and district lacked a succession of able, zealous, and enthusiastic naturalists to keep alive in our midst the love of outdoor nature.

The principle of federation, of which the Yorkshire Naturalists' Union has been one of the most striking examples in the kingdom, was not long in following the establishment of local Societies; and in September 1861 a largely attended gathering of Naturalists took place at Heckmondwike to celebrate the first meeting of a local society which had been established then a few weeks before.

At this meeting, at which were present representatives from Huddersfield, Halifax, Wakefield, and Heckmondwike, Mr. William Talbot of Wakefield introduced a discussion on the advisability of more combined and organized intercourse among the Societies, and pointed out the mutual benefits which would accrue. He was warmly supported, and on his motion it was unanimously resolved to form a Union of Societies for the purpose of holding joint meetings periodically at the various places where Societies had already been established.

Thus the Heckmondwike Naturalists' Society, and the confederation of local societies which is now the Yorkshire Naturalists' Union, were founded at the same place and virtually about the same time.

Moreover it is to the glory of the Heckmondwike Society, which was thus associated with the Union at its inception, that it is the only Society which has uninterruptedly maintained its connection with the Union from that day to this, a period of half-a-century.

Further than this, the headquarters of the Union were at Heckmondwike during its first two years, 1861 and 1862, Mr. James Ellis of that place being then honorary Secretary. The headquarters were again at Heckmondwike from 1870 to 1877, under the Secretaryship of Mr. J. M. Barber, to whose memory the gratitude of the Union is due for his fostering care of the infant organization.

Not only did Heckmondwike furnish the first Secretary, but in 1870, when the office of President was first instituted, it was occupied by a Heckmondwike member, Mr. T. B. Oldfield.

May it be hoped that the Heckmondwike Naturalists' Society may long flourish as the premier Society in our Union!

During this first period of the existence of the Union, its name was the "West Riding Consolidated Naturalists' Society," and its printed constitution (about 1863) stated its object to be "the effectual advancement of Natural Science," for, by the various Societies "meeting together, having a kindly interchange of thought, and becoming acquainted with the natural history of the districts of each other, a more rapid dissemination of knowledge is attained, and facilities afforded for the better acquisition, exhibition, and exchange of specimens."

The organization of the W. R. C. N. S. was very simple. For the first nine years there was only one office-bearer, the Secretary. No President was found necessary, the duties of that office devolving upon the President of the Society established at the place of meeting. The financial basis was, as it still in part is, a contribution from each Society of a penny per member.

The meetings during the first four years were indoors, but the attendance falling off, in 1866 outdoor field meetings were instituted. This was found to revive the enthusiasm of the earliest years, which had waned; and henceforward the meetings were popular, well-attended, and proved exceedingly useful in bringing naturalists together to their mutual benefit.

To understand the general method of procedure at the W. R. C. N. S. meetings, at all events during the period 1870 to 1876, it should be borne in mind that it was a *walking* Society. All the Societies were within walking distance o each other and all excursions were arranged within the area covered by the Societies, which were all in or near the South-west corner of the West Riding, Leeds being the furthest place represented.

The practice was for members to converge upon the place fixed for meeting, collecting as they went—and all the spoils were placed upon the table. Then competent botanists were called upon to name the plants, and other members to name the insects, the shells, the fossils, etc.

The disadvantages of these methods were obvious—the waste of time, and the want of scientific accuracy caused by mixing specimens gathered on several convergent lines of route.

These considerations, and the accession to the Union of Societies so far away as Bradford, York, and Selby, rendered a change inevitable.

About this time the Leeds Naturalists' Club had been working to good purpose, with a number of members who have since made reputations, such as James Abbott, Thomas Hick, W. Eagle Clarke, John W. Taylor, Edward E. Prince, W. Barwell Turner, etc., and their hon. Secretary, Mr. W. Denison Roebuck, had taken part in the W. R. C. N. S., being in 1876 appointed "annalist" (*i.e.* co-secretary with Mr. Barber).

It is to the far-seeing initiative of Mr. Roebuck that the present constitution of the Union is due—and a memorandum which he laid first of all before Messrs. G. T. Porritt and C. P. Hobkirk, and then before other members, embodied all the

salient points, the extension of the area to the whole county, the status of the Presidency, the establishment of Sections, the giving of a more scientific direction to the field-excursions, the character of the Annual Meeting and the publication of results, were all stated in that memorandum, which is still in existence.

The establishment of Sections, and at a later period of Committees of Research, has proved of the utmost value in increasing the scientific worth of the Union's work.

The careful restriction of the area and scope of the Excursions and the printing of a detailed circular has promoted the same end. At the beginning there was a danger of the introduction of the pic-nic and sight-seeing element, but at the opening meeting, held at Pontefract on the 2nd of April, 1877, after the churches of that town had been shown, the members proved themselves wiser than their leaders, and promptly and emphatically laid it down that there were to be no sight-seeing arrangements made, no field-lecturing, or anything else likely to interfere with active personal investigation. On these lines the Excursions have ever since been conducted, and with remarkable success ; and specialized meetings such as Fungus Forays and Marine Biological investigations have proved of great importance.

The Annual Meetings, held in a different centre each year, have promoted the social and personal intercourse of members.

The status of the Presidency was from the beginning a matter of care. It was felt desirable to have a combination of scientific eminence with a direct Yorkshire connection; to have a man of sufficient scientific rank to deliver an Annual Address of value and interest, and at the same time a Yorkshireman by birth, residence or other close association. Our valued member, the Rev. Canon William Fowler was the first of a line including such names as Dr. H. Clifton Sorby, Prof. W. C. Williamson, Mr. J. Gilbert Baker, Rev. W. H. Dallinger, Lord Walsingham, Sir R. Payne-Gallwey, Mr. W. H. Hudleston, Mr. H. E. Dresser, the Bishop of Wakefield (Rev. W. Walsham How), Prof. A. H. Green, Mr. C. P. Hobkirk, Mr. Henry Seebohm, Mr. R. H. Tiddeman, Dr. Robert Braithwaite, Mr. John Cordeaux, Prof. W. Boyd Dawkins, Sir Michael Foster, Mr. Wm. West, Mr. G. T. Porritt, Prof. P. F. Kendall, Mr. W. Denison Roebuck, Mr. A. H. Pawson, Mr. G. W. Lamplugh, Mr. W. Eagle Clarke, Mr. Chas. Crossland, Dr. Wheelton Hind, Mr. W. H. St. Quintin, Prof. A. C. Seward and Mr. Alfred Harker.

The rules were re-drafted in 1883, the changes from those of 1877 being but slight, the main one being the establishment of our procedure upon the lines of the British Association. The result has been a maximum of scientific result with a minimum of friction, and the placing of the government of a scientific society in the hands of its scientific members.

The publications of the Union have consisted of "Transactions" and "The Naturalist," and the result of the scientific activity of the Union and its members has been the publication of a large amount of most valuable matter, restricted to our own county, and so of the more value.

The Union has been fortunate in associating with its work the greater number of Yorkshire workers in all departments—whose ready and willing aid has aided the office-bearers in their arduous labours. Mr. Roebuck was hon. Secretary from 1876 to 1901, with successive colleagues in Mr. Geo. Brook, Mr. W. Eagle Clarke. Rev. E. P. Knubley, Mr. Edgar R. Waite, and Mr. Edwin Hawkesworth—and when he retired it was most fortunate for the Union that there was available so able, so capable, so energetic a successor as Mr. Thomas Sheppard, under whose administration the Union has fully maintained its high scientific and administrative position. May the Union always be as fortunate at the time of need!

All that remains to be said is that good as its work has been, excellent as have been the results, the Union has never at any time received from the county the full amount of financial support that it most emphatically deserves, that it absolutely needs.

Let one result of this Jubilee Meeting be the establishment of the Union upon a sound, firm, financial basis.

A brief history of the Heckmondwike Naturalists' Society

Although not the oldest Society of its kind in Yorkshire, the Heckmondwike Naturalists' Society holds the unique record of being the only Society which has continuously upheld its membership of the West Riding Consolidated Naturalists' Society and the Yorkshire Naturalists' Union, during the whole 50 years of their joint existence.

It was founded in 1861, but a few months earlier than the "Consolidated Society," in the foundation of which the Heckmondwike Society took a prominent part. It was at an "Organisation meeting of the Heckmondwike Naturalists' Society" held in September, 1861, that the subject of a Union was first seriously discussed. Mr. W. Talbot, of Wakefield, introduced the matter, and it was unanimously decided to call a meeting of representatives of kindred societies for the special purpose of founding a Union of Naturalists' Societies. This meeting took place at Huddersfield, on January 18th, 1862, and on the motion of Mr. S. J. Swift, the president of the Heckmondwike Society, it was unanimously decided to name the Union the "West Riding Consolidated Naturalists' Society." Heckmondwike supplied the first Hon. Secretary in the person of Mr. James Ellis, who was succeeded in 1863 by Mr. Benj. Bradley, of Sheepridge, Huddersfield. In 1867 the Heckmondwike Society again supplied this important officer, Mr. Robert Smith, of Dewsbury Moor, being appointed to succeed Mr. Bradley. In 1870 Mr. J. M. Barber, of Heckmondwike, undertook the duties and continued to hold the office until the basis of the Society was broadened, and it became re-organised as the Yorkshire Naturalists' Union in 1877.

During these years the Heckmondwike Society was very active, the number of members averaging about 30. Following Mr. Swift as president came Mr. J. Exley in 1863, Mr. Robert Smith 1865, Dr. T. B. Oldfield 1867, Mr. J. M. Barber 1882, Dr. J. A. Erskine Stuart 1887.

The meetings were first held at the Queen's Head Inn, Lower George Street (now Regent Street), and later for many years at the Wool Pack Inn, High Street, and from 1882 at the Mechanics' Institute and Club, Market Place.

In 1877 was founded the Heckmondwike Juvenile Naturalists' Society, by Mr. J. M. Barber, in order that the young might be given an opportunity of studying the wonders and beauties of nature, without the disadvantage of meeting at an inn. The meeting place was the old Mechanics' Institute in Back Lane, but in 1882 the Society migrated with the Institute to their larger premises in Market Street, and, the original cause of its separate formation from the senior society being now removed, it later became absorbed in the parent society.

In 1879 the Heckmondwike Society initiated another Union of Naturalist Societies. It was felt that the more distant fields visited by the Yorkshire Naturalists' Union took up more time and were more expensive than the working class members of the Society could afford. The Societies of Batley, Bradford, Dewsbury, Heckmondwike (senior and junior), Huddersfield, Liversedge, Mirfield, Rastrick and Brighouse, therefore, formed a Union known as the "Local Naturalists' Association," with Mr. J. M. Barber of Heckmondwike as Secretary. This Association flourished for a few years, but ceased to exist about the year 1885.

In the later "eighties" the Heckmondwike Society sank to a very low ebb, but was held together by a few loyal spirits until such time as an opportunity presented itself of resuscitating its fallen fortunes, which happened about the year 1896. From that time to this the Society has again flourished and continued its useful and valuable work.

C.B.B.

Circular 236.

Yorkshire Naturalists' Union.

THE 236TH MEETING

WILL BE HELD AT

RICCALL,

FOR THE INVESTIGATION OF THE COMMON,

ON

SATURDAY, MAY 4th, 1912.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland & N.E. Railways, which have booking arrangements for Riccall, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. The Tickets will be issued on Friday, the 3rd, and Saturday, the 4th of May, and will be available for returning on Saturday, and up to and including Monday, May 6th, 1912. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it. At Stations on the N.E. and H. & B. Railways, tickets at the reduced fares will be issued on production of the signed card of membership.

BOOKS AND MAPS.—The District for investigation is included in Sheet 206, six inch Ordnance Map, and the Geological Route in Sheet 63 (93 N.E.) one inch Ordnance Map, both this Sheet and the six inch Sheets 206 and 207 are published geologically coloured, but the drift edition alone is of any use. Reference may be made to papers by Dr. H. F. Parsons on the Alluvial Strata of the Lower Ouse Valley (Proc. Y.G. and Pol. Soc. 1877) and on the "Trias of the Southern Part of the Vale of York" (op. cit. 1879) by Prof. P. F. Kendall, M.Sc., F.G.S., on the "Glaciation of Yorkshire" (op. cit. 1893; and by the Rev. C. D. Ash, M.A. on the "Lepidoptera of Skipwith" (Nat., March, 1895, p. 83, and March, 1896, p. 85); also Excursion Circulars No. 6 of 1879, Riccall Common, and No. 124, 1896, Skipwith Common; also Robinson's "Flora of the East Riding of Yorkshire."

HEADQUARTERS.—Hare and Hounds Inn, Riccall.

ROUTES.—Riccall can be reached by rail both from York and Selby at convenient times. Mr. W. N. Cheesman, J.P., F.L.S., Dr. W. J. Fordham, Mr. Wm. Ingham, B.A., and probably the Rev. C. D. Ash, M.A., will act as guides.

One or other of these gentlemen will meet the trains at Riccall Station which leave York at 9-27 a.m. and 10-30 a.m., due at Riccall at 9-46 a.m. and 10-57 a.m.; and leaving Selby at 9-13 a.m. and 10-25 a.m., due at Riccall at 9-23 a.m. and 10-34 a.m. The members will commence work immediately on arrival, the Common being about one mile from the Station. The Rev. C. D. Ash

remarks that members had better be warned that there is some rather treacherous boggy ground near the Hollow Pit Ponds, which should not be explored without a guide. Members arriving by later trains to Riccall are advised to make direct for the Common.

PERMISSION to visit their properties has been kindly granted by Lord Wenlock and by Riley Briggs, Esq., so far as regards his lands on Riccall Common and the two woods adjoining Market Weighton Road on the South. The other portions of the estate belonging to Mr. Riley Briggs, and the woods thereon, must not be entered by members owing to the pheasants having commenced laying.

CAUTION AS TO USE OF LIGHTS.—Members are requested to be very careful in the use of lights on the Common, and permission to explore the Common and woods is only given on this condition. The nests and eggs of game and wild fowl nesting on the Common and in the woods must not be molested.

GEOLOGY.—The Geological Section will probably be officially represented.

Mr. H. Culpin writes:—Riccall Common. The district forms part of the alluvial plain of York. Sections are not frequent, but the following particulars recorded by Dr. H. Franklin Parsons in the *Proceedings Yorks. Geol. Soc.*, Vol. VI., p. 238, will show members what to expect:—Brickyard between Riccall and Escrick: Top soil, 1-ft.; Brown peaty sand, 1-ft.; Yellow sand, surface eroded, hollows lined with parting of clay, 2-ft.; Coarse brown sand, 1-ft.; Gravel, 6 ins.; Laminated clay, 10-ft.; total, 15-ft. 6-ins. In a map in the *Proceedings Y.G.S.*, Vol. VII., Pl. XII. Dr. Parsons stated the depths at which the Trias has been found at three places in the district, viz.:—Cawood 90-ft., Osgoldby 25-ft., Selby 75-ft.

Geologists attending the meeting are recommended to go from Selby by way of the left bank of the Ouse until they reach the bridge by which the Market Weighton Road crosses the railway. This will give them an opportunity of noting the action of the river on its artificially raised banks, and they will also see a section of the natural bank. They should then take the Market Weighton Road for nearly three-quarters of a mile, and turn northwards by a field road on to the Common, after crossing which they will strike a convenient path to Riccall Station. The route can also be taken in the opposite direction. On the Common are some very interesting peat sections, overlain by blown sand. Many of the ditches just now also show instructive details.

If time permits, a visit should be made to a Clay Pit on the road from Selby to Snaith, about half-a-mile south of the bridge over the railway.

ARCHÆOLOGY.

Mr. W. N. Cheesman, J.P., F.L.S., writes:—Riccall (Domesday Richale). Here Harold Hardrada in 1066 moored his 300 ships to attack York, defeating the defenders Earls Edwin and Morcar at Fulford, after which York submitted and gave hostages.

Harold Hardrada retired to his army near Stamford Bridge, where King Harold of England, after the memorable march from the South, surprised and completely routed the invaders.

A Saxon Chronicle runs:—"There were slain Harold Hardrada and Earl Tosti, and the Northmen who were there left were put to flight, and the English hotly slew them from behind as they came to their ships."

Tumuli or burial mounds called "Danes Hills" may still be seen between Riccall and Skipwith, where the invaders were allowed to bury their dead. Riccall Church has a fine Norman South Door with beakhead mouldings. The Registers date from 1613, and contain some interesting entries made during the Parliamentary Wars.

Skipwith Church contains much Saxon (pre-Norman) work, some curious figure carvings of the same period, stone altar slab, with five crosses now in use, and an original Norman Door covered with exquisite ironwork.

BOTANY.—The Botanical Section will be officially represented by the President, Mr. Harold Wager, F.R.S.

Flowering Plants.—Mr. W. N. Cheesman, J.P., F.L.S., writes:—

Botanists working the Common from Selby are advised to take the river bank, over the toll bridge. Near the Olympic Works are Allium carinatum, *A. Scorodoprasum* and *A. oleraceum*. Some ponds by the riverside until recently yielded the four *Lemnas*, and the aquatic hepatic *Ricciella fluitans*, *Br.*, and

the fields adjoining *Riccia glauca*, Linn. *Campanula glomerata* is plentiful along the bank, as also is *C. latifolia*. Respecting the latter plant, Thomas Johnson, who in 1633 wrote an edition of "Gerard's Herbal," says:—"I have found this plant growing on the banks of the River Ouse, between York and Selby, the place where I was born."

Near Barlby may be seen *Colchicum autumnale*, now in fruit, and occasional spikes of *Botrychium lunaria*.

Leaving the river bank at Turnhead Farm and crossing the railway bridge *Rhinanthus major*, *Ehrh.* is seen along the road side, and in the first wood on the right *Pyrola minor*. Now the Common is reached may be found *Corydalis claviculata*, *Stellaria glauca*, *Hypericum elodes*, *Sium latifolium*, *Arctium majus*, *Pimpinella magna*, *Drosera rotundifolia* and *intermedia*, *Polygala vulgaris*, *Gentiana Pneumonanthe*, *Menyanthes trifoliata*, *Pinguicula vulgaris*, *Utricularia vulgaris*, *Hottonia palustris*, *Nasturtium amphibium*, *Vaccinium Myrtillus*, in Cliff Common Wood and on the Common near Skipwith. *Epipactis latifolia*, *Habenaria bifolia*, *Mentha Pulegium* in ponds near Skipwith Church, and on the Churchyard walls *Asplenium ruta-muraria*. *Isoetes lacustris*, and *Pilularia globulifera* should be looked for in the shallow ponds. They were formerly abundant. The latter still grows in two or three places, but *Isoetes* has not been seen for some years.

Some six or eight species of the *Order Characeæ* await definite determination.

Mr. Wm. Ingham, B.A., adds:—Riccall Common has been well worked for these plants. Early in May the following may be found in flower:—*Ranunculus sardous*, *Corydalis claviculata*, *Scleranthus annuus*, *Ornithopus perpusillus Alchemilla arvensis*, *Apium inundatum*, *Samolus Valerandi*, *Littorella uniflora*, *Alisma ranunculoides*, *Scirpus fluitans*, *Carex pulicaris*, *C. ovalis*, *C. panicea*, *C. dioica*, *Apera spica-venti*, *Equisetum palustre* and *E. limosum*.

Mosses and Hepatics.—The Yorkshire Bryological Committee will be officially represented by the Chairman, Mr. Wm. Ingham, B.A.

Mr. Wm. Ingham, B.A., writes:—Riccall Common is rich ground in all the departments of Bryology. Selecting from a long list the chief are the following—

I.—SPHAGNA. *S laricinum*, *S. cuspidatum* var. *falcatum*, *S. fimbriatum* var. *robustum*, *S. crassicladum*, *S. rufescens*, *S. subnitens*, with several of its varieties, *S. inundatum*, *S cymbifolium* of several varieties, and a beautiful *Sphagnum S. papillosum* var. *sub-læve*, *forma glaucescens*.

II.—HEPATICS. *Fossombronia Dumortieri*, *Lobhozia gracilis*, *Cephaloziella bifida*, *Calypogeia fissa*, *Scapania irrigua* and *Blepharozia ciliaris*.

III.—TRUE MOSSES. *Polytrichum gracile*, *P. commune* var. *fastigiatum*, *Campylopus atrovirens* var. *gracilis*, *C. fragilis*, *C. brevipilus*, *Dicranella cerviculata*, *Dicranum spurium* of fine growth, *Hypnum elodes*, *H. polyganum* var. *stagnatum*, *H. stellatum*, *H. Wilsoni* and its var. *hamatum*, *H. lycopodioides*, a rare moss in extensive sheets, *H. fluitans* and its vars., *Jeanbernati*, *gracile*, *falcatum*, *and Arnellii*, the last very rare variety in extensive sheets, *H. exannulatum* and its vars., *brachydictyon* and *falcifolium*, *H. revolvens*. *H. intermedium fruiting*, *H. falcatum*, *H. imponens*, *H. molluscum*, a marsh form, *H. scorpioides*, *H. stramineum*, *H. cordifolium fruiting*, and *H. giganteum*.

Fungi.—The Yorkshire Mycological Committee will be represented.

Mr. W. N. Cheesman, J.P., F.L.S., writes:—The woods surrounding the Common have been well worked at several forays for autumnal species, and many rare and interesting records have been made, viz.:—*Lepiota metulæspora*, *L. delicata*, *Tricholoma onychinum*, *T. lascivum*, *Clitocybe ericetorum*, *Mycena hæmatopoda*, *Volvaria speciosa*, *Eccilia atropunctata*, *Pholiata aurea*, *Flammula gummosa*, *Cortinarius tabularis*, *C. hemitrichus*, *Gomphidius roseus*, *Paxillus arcelloides*, *Lactarius circellatus*, *Russula xerampelina*, *Boletus spadiceus*, *Polystictus radiatus-Craterellus sinuosus*, *Hymenochæte fuliginosa*, *Peniophora rosea*, *Cordyceps ophioglossoides*, parasitic on *Elaphomyces granulatus*, *Rhizina inflata*, *Peziza mellea*. It is very desirable that vernal species should be now recorded, few *Agarics* will be seen, but a look out might be made for *Morels* and allied genera, as several are known to occur but have not been officially recorded. The Mycological Committee will be pleased to receive any specimens of the groups *Ascomycetes*, *Hyphomycetes* and *Mycetozoa*, as the records for these are at present very incomplete for the Common.

MICRO-ZOOLOGY and BOTANY.—This Section will be officially represented by its Secretary, Mr. J. W. H. Johnson, B.Sc., F.L.S.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will probably be officially represented.

Mammals.—Rev. C. D. Ash, M.A., states that the following species occur, viz.:—Fox, Hare, Rabbit, Stoat, Weasel, Water Vole, Mole, Shrew.

Birds.—The Rev. C. D. Ash, M.A., writes:—The following all breed on Skipwith Common. Long-eared Owl, Black-headed Gull (a large colony), Snipe, Redshank, Mallard, Teal, Shoveller, Coot, Moorhen, Lapwing, Whinchat, Green Woodpecker, Cole Tit.

Reptiles and Amphibians.—The Rev. C. D. Ash, M.A., states that the following species occur, viz.:—Viper (common) and Slowworm (rare).

CONCHOLOGY. — The Conchological Section will be officially represented by the President of the Union, Mr. John W. Taylor.

ENTOMOLOGY. — The Entomological Section will be officially represented by one of the Secretaries, Mr. B. Morley.

Lepidoptera.—The Rev. C. D. Ash, M.A., writes:—A very handsome melanic form of *A. menyanthidis* occurs on the Common, and other species to be found in May are *E. indigata*, *A. myrtilli*, *S. carpini*, *C. cosmophorana*, *H. glauca* and several of the commoner heath species. Larvæ of *G. papilionaria* are sometimes plentiful on the birches, and *S. belgiaria* and *A. agathina* (at night) on the heather—the latter species is very fine and varied.

Dr. W. J. Fordham states he has taken *C. flavicornis* on sallow bushes.

HYMENOPTERA.—Dr. W. J. Fordham states he has taken *Lophyrus pini* and *Trichiosoma betuli*.

Coleoptera.—Dr. W. J. Fordham writes:—The following species of Water Beetles occur, viz.:—*Agabus chalconotus*, *A. unguicularis*, *A. femoralis*, *A. sturmi*, *A. paludosus*, *A. bipustulatus*, *Hydroporus tristis*, *H. melanarius*, *H. obscurus*, *H. umbrosus*, *H. gyllenhali*, *H. planus*, *H. dorsalis*, *H. pubescens*, *H. erythrocephalus*. *H. lituratus*, *H. lineatus*, *H. lepidus*, *Ilybius guttiger*, *I. fuliginosus*, *I. ater*, *Philhydrus nigricans*, *P. testaceus*, *P. melanocephalus*, *Helochares lividus*, *Rhantus bistriatus*, *R. exoletus*, *R. grapii* and *Gymnusa brevicollis*, *Cælambus inæqualis*, *Colymbetes fuscus*, *Anacæna globulus*, *Dytiscus marginalis and D. punctulatus*. Of terrestial species I believe the Rev. C. D. Ash has taken *Carabus nitens*. I have taken *Bembidium lampros*, *Lina populi*, *Geotrupes typhæus*, *Endomychus coccineus* and *Aromia moschata*.

Mr. T. Stainforth, B.A., adds that he has taken on Skipwith Common, *Cicindela campestris* (larvæ), *Notiophilus palustris*, *Metabletus foveola* and *Lochmæa suturalis*; and on the banks of the Ouse, near Selby, *Tachypus flavipes* and *Bembidium lunatum* in abundance.

Mr. J. W. Carter, F.E.S., states that *Pterostichus oblongo-punctatus*, *F.* was taken rather commonly in April, 1911.

ARACHNIDA.—The Arachnida Committee will be officially represented by the Chairman, Mr. W. Falconer.

Mr. Falconer writes:—106 species of *Arachnids* have been obtained on the Common, many of which are rare in Yorkshire, and generally speaking, elsewhere; *Theridion impressum L. Koch*, *Floronia bucculenta Clerck*, *Prosthesima apricorum L.K.* (*petiverii Scop.*), *Theridion pictum Hahn*, *Bathyphantes setiger F.O.P. Cb.*, *Porrhomma miserum Camb.*, *Mengea warburtonii Camb.*, *Coryphæus distinctus Sim.*, *Enidia cornuta Bl.*, *Cnephalocotes elegans Camb.*, *Epeira patagiata C.L. Koch*, *Pirata latitans Bl.*, etc. The date chosen is rather too early for most of these, but as the Common, being partly in an aboriginal condition, possesses abundant shelter such as spiders love, there is every prospect of others as rare being found.

PROGRAMME OF MEETINGS :—

4-45 p.m., Meat Tea, 1/9 each,
5-30 p.m., Sectional Meetings,
5-45 p.m., General Meeting,
All at Hare & Hounds Inn, Riccall.

The Chair will be taken by the President of the Union.

Trains—For York, 6-49 p.m. Selby, 5-15 and 7-54 p.m.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before May 12th, to W. E. L. Wattam, 30 Towngate, Newsome, Huddersfield.

Yorkshire Naturalists' Union.

President:
JOHN W. TAYLOR, Leeds.
Divisional Secretary:
J. W. STATHER, F.G.S., Brookside, Newland Park, Hull.
Hon. Secretaries:
T. W. WOODHEAD, Ph.D., F.L.S., Technical College, Huddersfield.
W. E. L. WATTAM, 30 Towngate, Newsome, Huddersfield.
Hon. Treasurer:
H. CULPIN, 7 St. Mary's Road, Doncaster.

THE 237TH MEETING

WILL BE HELD AT

BRIDLINGTON

FROM

Saturday, May 25, to Whit-Monday, May 27, 1912.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland & N.E. Railways, which have booking arrangements for Bridlington, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Tickets taken on Friday, Saturday, or Monday, May 24th to May 27th inclusive, will be available for returning any day up to and including Tuesday, May 28th, 1912. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it. At Stations on the N.E. and H. & B. Railways, tickets at the reduced fares will be issued on production of the signed card of membership.

BOOKS AND MAPS.—The whole area is included in Sheets 55 and 65 of the One-Inch Ordnance Map, which may be obtained geologically coloured. Reference should be made to Phillips' "Illustrations of Yorkshire Geology," and "Rivers, Mountains, and Sea-Coast of Yorkshire;" the "Handbook to Flamborough Village and Headland;" the "Drifts of Flamborough Headland," by G. W. Lamplugh (Q.J.G.S., 1891); the "Yorkshire Chalk," by Dr. A. W. Rowe, and C. D. Sherborn (Proc. Geol. Assn., 1904); T. Sheppard's "Geological Rambles in East Yorkshire" (1903); J. F. Robinson's "East Riding Flora" (1902); C. G. Danford's "Belemnites of the Speeton Clays" (Trans. Hull Geol. Soc., 1906); Wade's "Birds of Bempton Cliffs" (1903); and T. H. Nelson's "The Birds of Yorkshire" (1907). See also previous Y.N.U. programmes for Flamborough (No. 116, with map, and No. 194).

THE DISTRICT to be investigated includes the Headland of Flamborough, particularly the cliff line between Bridlington and Speeton. Generally speaking, the area to be examined is defined on the west by the North-Eastern Railway, and on the north-east and south-east by the sea. The district includes a variety of conditions favourable to almost all branches of natural history.

HEADQUARTERS.—The Station Hotel, Bridlington (close to the station). Terms: (bed, breakfast, and dinner) 6s. 6d. per day. Members proposing to stay should *communicate with the manager at once*. Rooms will be allotted in the order the applications are received.

Accommodation for those who so desire can also be obtained at Mrs. Topham, Aingarth, Beaconsfield, Bridlington. Terms: 14s. 6d., Friday Evening to Tuesday morning.

EVENING MEETINGS.—A room has been set apart for the use of the members at the Hotel. Amongst the papers to be read and discussed on Saturday evening, at 8 p.m., are:—

(1) "The Evolution of Bridlington." by Mr. Thomas Sheppard, F.G.S., etc.
(2) "'Moorlog,' an interesting chapter in the history of the North Sea," by Mr. J. W. Stather, F.G.S.

EXHIBITION.—During the meeting Mr. Thomas Sheppard will exhibit his collection of geological and antiquarian views of Bridlington and District, in the large room at the Hotel.

ROUTES.—Saturday, May 25th.—Geologists, led by members of the Hull Geological Society, will leave the Station Hotel at 9-30 a.m. and examine the coast sections between Bridlington and South Landing.

The Botanists, under the guidance of Mr. J. F. Robinson, will visit Boynton Woods, leaving the Station Hotel at 9-30 a.m. Dinner at 6 o'clock.

Any additional information respecting Routes will be found posted up in the large room at the Hotel.

Monday, May 27th.—The Geologists will proceed to Flamborough by train leaving Bridlington at 9-15 a.m., and examine the coast sections from Thornwick Bay to South Landing, walking back to Bridlington, or if preferred, can travel back by train.

The Botanists, etc., will also proceed to Flamborough by the 9-15 a.m. train, and walk back to Bridlington via Danes' Dyke Ravine.

PERMISSION to visit their properties has been kindly granted by John Upton, Esq., T. G. Lloyd Greame, Esq., and the Agent of the Boynton Estate, conditionally that great care is exercised in not disturbing the nesting of Pheasants and Partridges.

GEOLOGY.—The Geological Section will be officially represented by its President, Mr. T. Sheppard, F.G.S. etc. The Glacial Committee and Coast Erosion Committee by Mr. J. W. Stather, F.G.S.

Mr. J. W. Stather, F.G.S., writes:—**Glacial Beds.**—Glacial deposits are in evidence almost everywhere on Flamborough Head, but the best sections are to be found on the south side near Bridlington, and in Filey Bay on the north side.

Speeton Estuarine Shell Bed.—At the base of the Glacial deposits on Middle Cliff Ridge at Speeton, an estuarine shell bed of muddy sand deserves examination. It has also recently been traced along the shore towards Reighton Gap.

The Sewerby Buried Cliff.—One of the most interesting sections of the whole coast-line occurs at the commencement of the Chalk, on the south side of the headland, and though obscured by slipped material, it has been better exposed during the early spring of this year than for many years past. It consists of an ancient cliff of chalk buried under glacial beds. From the deposits backed up against the old cliff, a large quantity of the fragmentary remains of mammals, fish, and birds have been obtained from time to time.

Upper Cretaceous Beds.—With regard to the Chalk, the recent work done by Dr. A. W. Rowe and Mr. C. D. Sherborn has gone far towards working out the zonal sub-divisions (Proc. Geol. Assn., 1904), but much remains to be done by local observers. The authors identified the following zones in the cliffs on the south side of the headland. (*a*) *Actinocamax quadratus*. (*b*) *Marsupites testudinarius*. (*c*) *Micraster cor-anguinum*. The fossil sponges, for which the chalk of Flamborough Head is celebrated, will be found most plentifully between Sewerby and Danes' Dyke, and the bed of *Marsupites* in the cliff, two or three hundred yards west of Danes' Dyke. No flint occurs in the chalk cliffs on the south side of the headland, but nodules begin to appear at High Stacks, a little south of the Lighthouse. From Selwicks Bay to the high cliffs of Buckton, the sections are made up entirely of flinty chalk (zones of *Micraster cor-testudinarium*, *Holaster planus*, *Terebratulina gracilis*, and *Rhynchonella cuvieri*, according to Dr. Rowe). Under Buckton, the softer flintless lower chalk rises into the base of the cliff. The details of this portion of the Cretaceous series have been carefully worked out by Mr. W. Hill.

Lower Cretaceous Beds.—The Speeton clays come out from under the chalk escarpment at Speeton, and form a low broken under-cliff for about a mile. Under favourable conditions, it is possible to trace a definite succession of zones, each containing fossils proper to it, and not found elsewhere.

ARCHÆOLOGY.—Mr. Thos. Sheppard, F.G.S., writes:
The district is remarkable for its wealth of remains of prehistoric sites, There are several stone weapons found, which are quite peculiar to the Bridlington area. The so-called Danes' Dyke is one of the finest British earthworks in the North of England. At Ullrome, a few miles to the south of Bridlington, Mr. T. Boynton, F.S.A., discovered lake-dwellings of the bronze and stone ages, which are among the most important found in Britain.

BOTANY.—The Botanical Section will be officially represented by the Secretary, Mr. J. F. Robinson, who writes:—

Flowering Plants.—Although not noted for anything very remarkable, still the flowering plant species that may be found on the peninsular portion of the Flamborough Headland, and the ground of the interior somewhat inland from it, as for example, near Boynton, Bempton, and Buckton, are quite numerous and not uninteresting.

In wet, clayey places, even quite near the cliff edge, *Ranunculus hederaceus* grows with the Grass of Parnassus and *Pinguicula*. *Ranunculus auricomus* is plentiful near Danes' Dyke, where, also, there is a record for *Aquilegia vulgaris* which should be verified if possible. *Cochlearia officinalis* is abundant and very variable; whilst *C. danica* not known here as yet should be sought for. *Sisymbrium Sophia* ('colonist' or 'alien') has been gathered near Flamboro' Lighthouse, where also grows *Cerastium tetrandrum*. *C. semidecandrum* with the little whitlow-grass (*Erophila*) and *Saxifraga tridactylites*, are frequent in chalky, gravelly places. *Geranium sanguineum*, *Vicia sylvatica*, *Rosa pimpinellifolia* and *Serratula tinctoria*, are found near Speeton Beck, and towards Filey. Big patches of yellow-wort or yellow gentian (*Blackstonia perfoliata*) grow on the cliff ledges, between Danes' Dyke and the South Landing. Sedges are not very abundant but *Eriophorum angustifolium*, *Carex verna*, *C. distans*, with others may be found. The grasses *Aira præcox* and *Agrostis palustris* are common. *Crambe maritima*, a former record, but not seen during the last ten years, would be a welcome re-discovery.

The more inland district to be visited, namely, that of Boynton, is rich and interesting from a botanical point of view. *Clematis vitalba* is still here in its most northerly English station, and *Monotropa Hypopitys*, scarcely above ground, however at this season, may still be reckoned upon under beech trees on the chalk. Teesdale's record of the very rare *Galium anglicum*, "on an old wall near Boynton" has not been confirmed by recent botanists, but may be there still.

Mosses and Hepatics.—The Yorkshire Bryological Committee will be officially represented by the Chairman, Mr. Wm. Ingham, B.A.

Mr. Ingham writes:—The best ground for these plants is Danes' Dyke. On loose blocks of limestone on the side of the dyke grow the minute and rare *Seligeria pacifolia* and *S. calcarea*, known elsewhere in Yorkshire only at Goodmanham, near Market Weighton. Other mosses of the dyke are *Grimmia pulvinata*, *Fissidens adiantoides* var. *collinus* (on a grassy slope, the only known Yorkshire habitat for the variety), *Tortula muralis* (with hair points as long as leaves), *T. intermedia*. *Barbula unguiculata*, *Trichostomum crispulum*, *Zygodon viridissimus*, *Ulota phyllantha*, *Orthotrichum pulchellum* (the last three associated on a fallen tree), *Isothecium myurum*, *Brachythecium velutinum*, *Webera albicans*, *Cryphæa heteromalla* (found by Mr. Slater in June, 1894, and not recorded since; should be looked for on trees), *Eurhynchium prælongum*, *E. Swartzii*, *E. murale*, *E. confertum*, *Plagiothecium silvaticum*, *Amblystegium serpens* var. *minus*, *A. Juratzkanum*, *A. filicinum*. The Hepatics noted at the same time as the above (August, 1899) are *Conocephalus conicus*, *Radula complanata*, *Frullania dilatata*, *Plagiochila asplenioides*, *Lophocolea bidentata*. On the boulder clay cliffs chiefly in and by the sides of wet places the following mosses grow:—*Dicranella varia*, *Barbula tophacea* forma *luxurians* Braithw., *Tortula subulata*, *Trichostomum nitidum* (a very rare moss abundant at Thornwick Bay), *Bryum intermedium*, *B. pallens*, *B. pseudo-triquetrum*, *Bryum capillare* near var. *rosulatum*, *Webera albicans*, *Camptothecium lutescens*, *Thuidium tamariscinum*, *Brachythecium purum* (fine growth), *B. albicans*, *B. rutabulum* (fine growth), *B. velutinum*, *Eurhynchium rusciforme*, *E. striatum* (fine growth), *E. prælongum*, *Amblystegium filicinum*, *A. serpens*, *Hypnum stellatum* var. *protensum*, *H. polygamum*, *H. cupressiforme* var. *tectorum* (fine growth), var. *filiforme* and var. *resupinatum*, and *H. cuspidatum*.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will probably be be officially represented.

Mammals.—Mr. Sydney H. Smith writes:—Foxes occur in several places on or near the cliffs between Filey and Bridlington. Hares and Rabbits are numerous. Other species are Stoat, Weasel, Brown Rat, Water Vole, Mole, Short-tailed Field Vole, Long-tailed Field Mouse, Common Shrew and Pipistrelle, Long-eared and Noctule Bats.

Birds.—Mr. Wade writes:—At this time of year the district immediately round Bridlington offers no special attraction to the Ornithologist. A stretch of bare wold, varied by woods at Sewerby, Carnaby, and Rudston, contains nothing of special rarity. On the wold the Corn Bunting, Yellow Hammer and Skylark are the most noticeable birds, the hedges offering shelter to Whitethroats, common and lesser, Greenfinches, and Grey Linnets, and most of the farmyard ponds being frequented by a pair of Pied Wagtails. In the woods the common Whitethroat, Blackcap, Garden Warbler, Willow Wren, Great Tit, Blue Tit,

Spotted Flycatcher, Starling, Jackdaw, Rook, Ring Dove, Stock Dove, are perhaps the most numerous, with occasionally the Creeper, Barn Owl, Sparrow Hawk, and Kestrel. In the villages the Swallow and House Martin will be building their nests, and the wild cry of the Swift will be heard. The greatest centre of attraction is the cliffs, stretching from Flambro' Head to Speeton, where Razor Bills, Guillemots and Puffins are now producing eggs in countless numbers, for the edification of the visitors who throng the cliff-tops in May and June to watch the climbing, and, if lucky, some of the varieties of Razor Bill's and Guillemot's eggs, which have made the Bempton Cliffs famous, may be seen by the naturalists. The Kittiwakes, the most graceful of British Gulls, have several colonies along the cliffs. Carrion Crows, Jackdaws, and Herring Gulls exercise their thievish propensities among the eggs and young of all species. A pair of Kestrels here and there may be seen, and the eyrie of the Peregrine Falcons, which owes its existence to the protection of the Y.N.U., is visible from the top of the Bempton Cliffs. Rock Pipits, House Martins, Sand Martins, Starlings, Stock Doves and Rock Doves are also present as breeding species.

Reptiles and Amphibians.—Mr. Sydney H. Smith reports having seen Toad, Frog, and Smooth Newt. The Lizard also occurs.

CONCHOLOGY. — The Conchological Section will be officially represented by the President of the Union, Mr. John W. Taylor.

MARINE BIOLOGY.—The Marine Biology Committee will be officially represented by its Secretary, the Rev. F. H. Woods, B.D.

Mr. Woods writes:—The scarcity of pools with rock-containing algæ and corallines is not favourable to marine life generally, but two species of borer are to be found in the patches of clay at extreme low tide, *i.e.*, large numbers of empty shells are washed up. Some of them, such as *Scrobicularia prismatica* and *Manzonia costata*, are interesting and rare.

Algæ.—Mr. J. F. Robinson writes:—Neither the fresh water Algæ, which of course cannot be very numerous in this dry upland locality, nor yet the marine species, have been systematically investigated, although a large number of the latter have been gathered by the writer. If the ebb tide be followed the Laminarian zone may be reached and many interesting species of the three great classes of seaweeds—green, brown, and red—may be met with. In the shore and cave pools *Chylocadia articulata*, *Delesseria sanguinea*, *D. alata*, and *D. sinuosa*, *Plocamium coccinum*, *Laurencia pinnatifida*, *Ptilota sericea* or *plumosa*, with many more, say in Silex Bay or near North Landing at low water, will well reward the Algologist.

Coleoptera.—Mr. E. G. Bayford, F.E.S., writes:—Compared with that of the coast towns of Saltburn, Redcar and Scarborough, our knowledge of the beetle fauna of Bridlington is not very full. This is, no doubt chiefly, if not entirely due to the fact that it has not had the good fortune to possess a resident coleopterist. The work done during short stays by Canon Fowler, the Rev. W. C. Hey and others, provides good reason for the opinion that it is quite as good a place for the coleopterist as any of the three places mentioned. The following is a list of some of the best species associated with the district. *Nebria livida* F., *Dyschirius thoracicus* Rossi, *politus* Dej., *salinus* Schaum, *aeneus* Dej., *Chlaenius vestitus* Payk, *Harpalus calceatus* Sturm, re-introduced to the British list by Canon Fowler, who met with a single example here in 1879. *Platyderus ruficollis* Marsh, *Amara consularis* Duft, *Amara bifrons* Gyll, *Amara acuminata* Payk, *Bembidium lunatum*, Duft, *Bembidium saxatile* Gyll, *Quedius rufipes* Grav, *10 spp. of Bledius*, *Atomaria fimetarii* Herbst., *Atomaria elongatula* Er., *Georyssus pygmæus* F., *Corymbites metallicus* Payk, *Nacerdes melanura* L., *Cleonus sulcirostris* L. Particular attention should be paid to the genera *Harpalus*, *Dyschirius* and *Bledius*.

ARACHNIDA.—The Arachnida Committee will be officially represented by its Secretary, Mr. T. Stainforth, B.A.

Mr. Falconer writes:—Very little collecting has been done in the district, mostly along the line of the coast. Some 60 different kinds of *Arachnids* have so far been met with, all of them with the exception of *Tapinocyba praecox* Camb., *Xysticus erraticus* Bl. and *Tarentula andrenivora* Walck common and widely distributed Yorkshire species.

PROGRAMME OF MEETINGS:—For Monday, May 27th.

5 p.m., Meat Tea, 1/6 each,
5-45 p.m., Sectional Meetings,
6 p.m., General Meeting,
} All at Station Hotel.

The Chair will be taken by the President of the Union.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before June 4th, to W. E. L. Wattam, 30 Towngate, Newsome, Huddersfield.

CIRCULAR 238.

Yorkshire Naturalists' Union.

THE 238TH MEETING

WILL BE HELD AT

TANFIELD

For the investigation of the neighbourhood of Tanfield and Hackfall,

ON

SATURDAY, JUNE 15th, 1912.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland & N.E. Railways, which have booking arrangements for TANFIELD, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Tickets taken on Friday or Saturday, June 14th and 15th, will be available for returning any day up to and including Monday, June 17th, 1912. The N.E. Rly. Co. issue cheap Week-end Tickets and cheap Saturday Tickets at a single fare for the double journey. Minimum 3rd class fares 2/6 and 2/- respectively. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it. At Stations on the N.E. and H. & B. Railways, tickets at the reduced fares will be issued on production of the signed card of membership.

BOOKS AND MAPS.—The district for investigation is included in Sheets 51 and 52 (97 S.E. and 96 S.W.) one inch Ordnance Map (also published geologically coloured). The six inch Sheets are 101 and 102. Reference may be made to Davis and Lees' West Yorkshire, 1878 (Florula of Hack Fall at p. 287), and to the Ripon lists of plants by Mr. Pratt (in Millenary Record, 1892) and Rev. H. H. Slater (Trans Y.N.U., Parts 7 and 8), also F. A. Lee's "Flora of the West Riding." Miss Harrison published a list of Ferns in "The Naturalist" for June, 1856, pp. 136-7; the botanical works of Miss Plues include notices of the plants of the Ripon District. Geographical distribution of Vegetation in Yorkshire; Botanical Map of Harrogate and Skipton District, by Smith and Rankin. Reference may also be made to "The Birds of Yorkshire" by T. H. Nelson, Y.N.U. Circulars for March 29th, 1880, and No. 122, April, 1896 (with map).

HEADQUARTERS.—Bruce Arms, Tanfield, Bedale.

ROUTES.—Members will investigate both sides of the River Ure, proceeding upwards to Hack Fall. Convenient trains are due from Harrogate at 9-32 a.m. and 12-18 p.m. Members from the North may join at Melmerley Junction at 9-24 a.m. or 12-10 p m.

PERMISSION to visit their properties has been kindly granted by Miss Staveley (including admission to the gardens attached to Sleningford Hall), W. D. Arton, Esq. and Sir Willans Nussey. The Marquis of Ripon has also granted free permission to Hackfall grounds on members showing their Cards of Membership to the attendants when requested, as the public are not admitted to Hackfall except by payment.

Caution.—Members are also requested to note that great care is to be exercised in not disturbing the nesting of Pheasants and Partridges.

GEOLOGY.—There are four formations apparent in Ripon and neighbourhood:—1 Millstone Grit—Cayton Beds in three layers. 2 Permian Beds. 3 Trias or New Bed. 4 Glacial or Boulder Clay.

The upper layer of Cayton Beds contains abundance of Encrinites, the second plenty of Brachiopods, the third is a hard, fine sandstone. The following fossils have been noted:—*Orthsis resupinata, O. michellini, Productus semi-reticulatus, P. cora, P. aculeata, Spirifera lineata, S. trigonalis, S. striata, Spiriferina cristata, S. octo-plicata, Streptorhynchus crenistria, Strophomena analoga, Chonetes hardrensis, Rhynchonella pleurodon.* Over the above beds comes the Red Grit of the Plumpton series as found at Brimham and Studley Park. The Permian rests unconformably on the Plumpton Grit. The Trias lies East of the Ure and belongs to the Bunter series. It is a soft Red Sandstone and contains splendid contortions of Gypsum beds. The Boulder Clay is superimposed generally over the whole district.

BOTANY.

Flowering Plants.—The district to be traversed is extremely rich botanically. Amongst the rarer plants are *Thalictrum flavum, Ranunculus auricomus, Helleborus viridis, H. fœtidus, Aconitum napellus* and *Nuphar lutea. Cardamine amara, Arabis thaliana, A. hirsuta* and *Cochlearia officinalis* will be seen amongst the crucifers. Also occuring are *Cerastium glomeratum, Stellaria aquatica. S. uliginosa, Geranium pusillum, Euonymus europæus, Astragalus glycyphyllus, Comarum palustre, Bryonia dioica, Saxifraga tridactylites, S. granulata, Ægopodium podagraria, Myrrhis odorata, Adoxa, Valeriana dioica, Tanacetum vulgare, Artemisia vulgaris, Crepis paludosa* and *Vinca minor. Linaria cymbalaria,* along with *Sedum dasyphyllum,* occurs on the walls of Tanfield Churchyard. *Lathræa squamaria* will doubtless be seen at many places by the river bank, at the Plaster Pits especially. *Salvia verbanacea, Myosotis collina, Pinguicula vulgaris, Primula farinosa, Lysimachia nummularia, Orchis ustulata, O. morio* and *Carex acuta,* &c., should also be noted. Many species of the rarer ferns occur.

Mosses and Hepatics.—The Yorkshire Bryological Committee will be officially represented by the President, Mr. Wm. Ingham, B.A.

Mr. Ingham writes:—Tanfield is a good centre for Mosses, as the following indicate, many of which may be found at Hackfall:—*Polytrichum juniperinum*, *Dichodontium flavescens*, *Tetraphis Brownianum*, *Swartzia montana*, *Seligeria Doniana*, *Campylostelium saxicola*, *Cynodontium Bruntoni*, *Dicranum majus*, *D. spurium*, *Webera albicans*, *Bryum pendulum*, *B. pallescens*, *B. uliginosum*, *Pterygophyllum lucens*, *Amblystegium irriguum*, *A. fluviatile* and *Hypnum Patientiae*. The *Hepatics* to be found there are *Metzgeria furcata*, *Pellia Fabroniana*, *Plagiochila asplenioides* and *Bazzania trilobata*. No *Sphagna* (Peat Mosses) are on record for Tanfield.

Fungi.—The Yorkshire Mycological Committee will be officially represented by the Secretary, Mr. C. Crossland, and probably one or two other members of the Committee.

There are few, if any, records of Fungi for either Tanfield or Hackfall. Mr. Crossland will be pleased to have assistance in collecting specimens of Fungi of any description in either locality, but each should be kept separate.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will be officially represented by one of the Secretaries, Mr. Riley Fortune, F.Z.S.

Mammals.—Mr. Fortune writes:—There is very little information respecting Bats, and investigation with regard to this family is particularly desired. I have seen the Noctule, Long Eared, Pipistrelle and Whiskered Bats. Other Mammals noted are Hedgehog, Common, Lesser and Water Shrews, Stoat, Weasel, Badger, Otter, Fox, Squirrel, Wood Mouse, Field Mouse, Bank and Water Voles, Hare, Rabbit. Some little time ago the Polecat was reported, but identification was not satisfactory.

Birds.—The district is well wooded, and most of the warblers abound, including Grasshopper, Wood, Garden, Black Cap, Lesser Whitethroat, &c. Although game preserving is general, yet a few Sparrow Hawks and Kestrels may be found nesting, also the Barn, Tawny and Long Eared Owls. Kingfishers, Dippers and Sandpipers are plentiful along the river banks, and the Grey and Yellow Wagtails will also be seen. Green and Great Spotted Woodpeckers are not uncommon. The Creeper is plentiful and also the Goldcrest, and the Nuthatch has been noted. The Pied Flycatcher may be seen and the commoner species is very plentiful. Most of the commoner species are abundant. The district is in fact rich in bird life.

Fishes.—The portion of the Ure flowing through the district to be investigated is strictly preserved, consequently Trout and Grayling abound. Salmon run up as far as the wier at Masham, and Parr are found in the stream at all times. Sea and Bull Trout also occur. There are also large numbers of other fish, as Dace, Chub, Pike, Perch, Barbel, Eels, River Lamprey, Miller's Thumb, Gudgeon, Loach, Minnow, &c.

Reptiles and Amphibians.—The only members of these orders I have noted in the district are Adder, Slow Worm, Common Lizard, Toad, Frog, Crested and Smooth Newts. A look out should be kept for the Grass Snake and Palmated Newt.

CONCHOLOGY. — The Conchological Section will be officially represented by the President of the Union, Mr. John W. Taylor.

Mr. Taylor writes:—The Yoredale Valley is very rich in molluscan life, and the researches of the Rev. J. Dalton more than half a century ago, showed Hackfall and Mickley to be especially prolific in their yield of the rarer species. Eighty or more species are now known to occur in the immediate neighbourhood of Tanfield, but there are still several species which are almost certain to be found, yet have hitherto eluded detection. Of the eighty species living in the immediate district, forty-four are land-shells, amongst them being *Acanthinula lamellata*, found abundantly in Hackfall Woods, where *Vertigo antivertigo*, *substriata*, *pusilla*, *pygmæa* and *edentula*, *Pupa anglica*, *Acme lineata*, &c., are also locally common.

The most striking feature of the district is, however, the prodigious abundance of *Balea perversa* and *Pyramidula rupestris*, more especially beneath the topmost stones of all the walls in the vicinity, while the *Clausilia bidentata* with its magnificent variety *cravenensis* is plentiful at their base, and *Helicigona lapicida* though so common, is in dry weather usually securely concealed in the chinks and crevices. Near Aysgarth, further up the valley, its beautiful variety *radiata* has been found, and the two-banded variety of *Helicigona arbustorum* has occurred near the same place.

The Slugs are well represented by 11 species, of which the new British species *Limax tenellus* found in Hall Wood, Masham, is the most interesting.

Of fresh-water shells twenty-four species are now known to occur, of which seven are Pisidia, the rarest forms being *P. milium* and *P. nitidum*. There are eight Planorbes, the most interesting species being *Planorbis parvus*, which, if the identification is correct, is circumpolar in distribution, the American and Palæarctic forms being united by the more generalized form *Planorbis arcticus*, a species or race now restricted to the colder and more inclement northern regions. With favourable conditions our knowledge of the mollusca of the neighbourhood of Tanfield should be materially increased, especially in regard to the local modifications which are undoubtedly present.

ENTOMOLOGY. — The Entomological Section will be officially represented by Mr. G. T. Porritt, F.L.S., F.E.S.

Lepidoptera.—Mr. Porritt writes:—The area to be investigated includes one of the Yorkshire Districts for the rare *Dicranura bicuspis*, and which ought to be out at the date of the excursion. It should be looked for on the trunks of Alder and Birch.

Coleoptera.—The Coleoptera Committee will probably be represented by the Chairman, Mr. J. W. Carter, F.E.S., and Mr. H. Ostheide.

Mr. E. G. Bayford, F.E.S., writes:—Little is known of the Coleoptera of the area to be investigated. In the account of a previous visit of the Y.N.U., April 18th, 1896, from the pen of Mr. B. M. Smith (see "The Naturalist" for that year, pp. 189-196), a list of 25 species is given as having been observed on that occasion. Most of them are of common and general occurrence in the County, the best species being:—*Leistus spinibarbis* F., *Silpha atrata* L., *Aphodius punctato-sulcatus* Sturm, *Sericosomus brunneus* L., *Chrysomela polita* L. On a visit there a few years earlier the writer met with a specimen of *Staphylinus cæsareus* Ceder.

ARACHNIDA.—Mr Wm. Falconer writes:—No records for a very extensive area of which Ripon is the centre.

PROGRAMME OF MEETINGS:—

4-30 p.m., Meat Tea, 1/9 each,
5-0 p.m., Sectional Meetings,
5-15 p.m., General Meeting,
} Bruce Arms, Tanfield.

The Chair will be taken by the President of the Union.

Trains.—The last train for Harrogate and the South leaves Tanfield at 5-58 p.m. Members may by driving to Melmerly Junction (distance about four miles) catch trains for the North at 6-6 p.m. and 7-6 p.m., and for Harrogate and the South at 8-1 p.m. There is a half-day excursion from Bradford on the 15th June, leaving at 1-40 p.m., returning from Tanfield at 9-28 p.m. and Harrogate at 10-7 p.m., which should enable the 10-28 p.m. train Harrogate to Leeds to be caught.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before June 20th, to W. E. L. Wattam, 30 Towngate, Newsome, Huddersfield.

The next Excursion of the Union will be to Askern for Shirley Pool on Thursday, July 11th.

CIRCULAR 239.

Yorkshire Naturalists' Union.

President:

JOHN W. TAYLOR, Leeds.

Ex-Presidents:

JOHN GILBERT BAKER, F.R.S., F.L.S., Kew.
Rt. Hon. LORD WALSINGHAM, M.A., F.R.S., Thetford, Norfolk.
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HENRY EELES DRESSER, F.L.S., F.Z.S., London.
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W. E. L. WATTAM, 30 Towngate, Newsome, Huddersfield.

Hon. Treasurer:

H. CULPIN, 7 St. Mary's Road, Doncaster.

THE 239TH MEETING

WILL BE HELD AT

ASKERN

For the investigation of the neighbourhood of Shirley Pool,

ON

THURSDAY, JULY 11th, 1912.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland & N.E. Railways, which have booking arrangements for ASKERN, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it. At Stations on the N.E. and H. & B. Railways, tickets at the reduced fares will be issued on production of the signed card of membership.

BOOKS AND MAPS.—The whole of the district is comprised in Sheets 87 S.E and 87 N.E. for Geologists, and Sheets 79 S.W. and 88 N.W. for Botanists, etc., of the one inch Ordnance Map which may be obtained geologically coloured. Reference may also be made to Lankester's "Account of Askern and its Mineral Springs" (1842), which contains a sketch of its Geology (pp. 34—50, with coloured map), Botany (pp. 50—57), and Zoology (pp. 54—72); also Davis and Lee's "West Yorkshire"; F. A. Lee's "Flora of the West Riding"; "The Birds of Yorkshire," by T. H. Nelson, M.B.O.U.; and Y.N.U. Circulars for 20th May, 1886, 15th June, 1893 (No. 102), and 12th July, 1906 (No. 196), and "The Naturalist" for 1893, (pp. 283—293), and for 1906, (pp. 369—374).

THE DISTRICT to be visited (writes Mr. H. H. Corbett, M.R.C.S.) by the general body of Naturalists, is on the low lying, flat and marshy land to the south of Askern. This was formerly all fen and shallow lakes, with slightly raised sandy islands interspersed. Much of it is now reclaimed, but there are still many thickets and swamps that retain the old marshland flora and fauna.

HEADQUARTERS.—The Railway Hotel, Askern.

ROUTES.—The whole district to be visited is within two miles of Askern, and efficient guides will be provided. The members should meet at the Railway Hotel, at 10-15 a.m.

PERMISSION to visit their estates has been kindly granted by Mrs. F. Bacon Frank, Campsall, and Major C. Anne, Burghwallis.

GEOLOGY.—Mr. H. Culpin writes:—Askern, which by reason of its position on the Permian rocks overlooking the southern extension of the Vale of York, is at all times attractive to the Geologist, offers special inducements just now for a visit by our section.

Near the township on the west, shafts are being sunk through the Permian rocks and the Coal measures to the Barnsley seam. Close by, the Permian Middle Marls are being excavated for clay for bricks. Permission has been kindly granted by Mr. Jos Humble and Mr. W. A. Wallis respectively, to examine the colliery tip and the clay pit. On the tip, which it is suggested should be visited first, there will be opportunities of collecting fossils from (a) the beds at the base of the Lower Permian Limestone, and (b) the fresh water shell (*Carbonicola*) beds, the marine shell (*Pterinopecten*, *Lingula*, *&c.*) bands, the shales with fish remains, and the shales and sandstones with plant remains, of the Coal Measures.

On the west of the tip is a cutting which shows the Upper Permian Limestone faulted against the Lower Limestone. After inspecting this, the party will go to the clay pit, where marls with gypsum bands can be seen.

A field path can then be taken to Campsall by those who desire to examine the quarries in the Lower Permian Limestone west of that place.

The route suggested, however, is to proceed to Askern Mount, for the inspection of the tilted beds of Upper Permian Limestone of which it is formed. South-west of the Mount, and slightly below it, is a large gravel and sand pit. Here will be seen some 40 feet of coarse Permian Limestone gravel resting on what appear to be Triassic Sands.

If time permits, a visit can then be paid to the low-lying lands on the south and east, which will be searched for glacial débris. On the way, the soil may be examined for sub-fossil shells (*Limnæa*, *Planorbis*, *&c.*), which, especially on the mole hills, shew themselves "white as a rain-washed bone."

ARCHÆOLOGY.—Mr. H. H. Corbett writes:—On Sutton Common are some curious earthworks of Neolithic age, and Major Anne has kindly offered to have a section cut through one of these for the benefit of visitors interested in prehistoric archæology.

BOTANY.—The Botanical Section will be represented by Dr. T. W. Woodhead, F.L.S.

Flowering Plants.—Mr. H. H. Corbett writes:—Many interesting and rare hygrophiles and pelophiles are to be found. For lists of these see the former programmes of Askern meetings of the union.

The plant associations on the open fields of Sutton Common, are interesting in the way that they show the struggle between the original fen flora and the more recent weeds and herbage of cultivation The dominant grasses are *Agrostis vulgaris* and species of *Poa*. The wetter parts supporting *Aira caespitosa*, *Alopecurus geniculatus* and *Arundo phragmites*. Along with these are patches of *Juncus conglomeratus* and *J. glauca*, *Spiræa Ulmarya*, *Potentilla anserina* and *Thalictrum flavum*, while wherever the turf is thin from water having lodged on the surface, *Hydrocotyle* and *Polygonum amphibium* prevail.

The woods are mixed Birch, Oak, Willow and Alder with *Viburnum opulus* as a sub-dominant and a dense undergrowth of *Urtica dioica*, *Epilobium hirsutum*, *Iris pseudacorus* and *Arundo phragmites*.

Shirley Pool itself has a remarkable margin flora. The woodland association gives place to a dense jungle of *Arundo*, *Carex* and *Epilobium* with patches of *Lathræa thelypteris*. At the edge of the pool, *Arundo* and *Carex* almost give place to *Cladium* which forms a thick fringe to much of the pool. In the water itself is *hardly any living vegetation either floating or submerged*.

Fungi.—The Yorkshire Mycological Committee will be represented by Mr. W. N. Cheesman, J P., F.G.S.

VERTEBRATE ZOOLOGY.—Mr. H. H. Corbett writes:—

Mammals.—I know of no records of the Bats. The common wild mammals are to be seen. Moles abound, Hedgehogs are common, both Common and Lesser Shrews occur. Foxes are numerous, and there is little doubt that Badgers occur, as last summer "something" was digging out wasp nests at night.

Birds.—The dense woods and weed beds shelter many interesting species, Magpies and Jays are common. Herons visit the ponds, Mallard, Coot and Moorhen breed among the reeds, Snipe, Redshank and Lapwing on the marshy fields. Reed Warblers are very numerous.

Reptiles and Amphibians.—Grass Snake, Smooth Newt, Frog and Toad, are the only records, all are common.

Fishes.—Both species of Stickleback are common in the ditches, Minnows are frequent in those drains that have a fairly rapid current. In Shirley Pool are Pike, Roach, Bream, Tench and Eels.

CONCHOLOGY. — The Conchological Section will be officially represented by the President of the Union, Mr. John W. Taylor.

Mr. H. H. Corbett writes:—Besides the species noted in former programmes *Hyalinia nitida* is abundant and fine among herbage and under logs at Shirley Pool, and *Limnæa glaber* occurs in some of the ditches.

ENTOMOLOGY. — The Entomological Section will be officially represented by its President, Mr. H. H. Corbett, M.R.C.S.

The district is rich in all orders of insects.

Lepidoptera.—Mr. H. H. Corbett writes:—In addition to the species named in former programmes and reports, larvæ of *Tortrix branderiana* may be found in Askern, or if too late in the season, the imagines may be beaten from the trees.

Mr. G. T. Porritt writes:—*Ennomos fuscantaria* occurs in the wood near the pool at Askern, on the way to Shirley, and the larvæ ought to be well grown on the Ash trees. In the hawthorn hedge bordering the same wood *Tortrix cinnamomeana* is abundant.

Neuroptera.—Mr. G. T. Porritt writes:—Shirley Pool is the Yorkshire locality for the fine Dragon Fly, *Libellula fulva*, and its only locality in Northern Britain. It is abundant there, but this early season, the date of the excursion will be too late for it, though a few belated stragglers will no doubt be about. Other interesting Neuroptera and Trichoptera occur in the district.

Coleoptera.—The Coleoptera Committee will be represented by Mr. H. H. Corbett, and probably by Mr. E. G. Bayford, F.E.S., and Mr. M. L. Thompson, F.E.S.

Mr. H. H. Corbett writes:—I know no district where so many species of Coleoptera may be found in so limited an area, as in the immediate surroundings of Shirley Pool. I have a list of about 300 species that I have taken there. Besides those named in former Askern programmes, the following rare or local species have been found:—*Carabus granulatus, Notiophilus palustris, Bradycellus placidus, Pterostichus oblongo-punctatus, Pt. minor, Bembidium rufescens, Noterus clavicornis, Oxypoda lividipennis, Hygronoma dimidiata, Hypocyptus lævisculus*, Ctenus nigritulus, *St. subæneus, Lestiva heeri, Homalium punctipenne. Megarthrus sinuaticollis, Prognatha quadricornis, Bryaxis juncorum, Læmophlœus ferrugineus, Psammoechus bipunctatus, Cryptophagus lycoperdi, Cis alni, C. nitidus, C. bidentatus.*

ARACHNIDA.—Mr. W. Falconer writes:—The Askern district has so far received only two passing visits from arachnologists. Their united captures which totalled 50 different kinds of arachnids indicate that the locality is a promising one, several of the scarcer or more local Yorkshire spiders being met with, viz.:—*Clubiona brevipes Bl* (oak trees), *C. neglecta Camb, Theridion bimaculatum Linn, T. pulchellum Walck, Leptyphantes obscurus Bl, Entelecara acuminata Wid, Metopobactrus prominulus Camb.*, and *Salticus cingulatus Panz.*

PROGRAMME OF MEETINGS:—

4-30 p.m., Meat Tea, 1/6 each,
5-30 p.m., Sectional Meetings,
5-45 p.m., General Meeting,
} At the Railway Hotel, Askern.

The Chair will be taken by the President of the Union.

Trains.—For the West 6-15 and 8-28 p.m. For South and East 6-37 and 8-55 p m.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before July 20th, to W. E. L. Wattam, 30 Towngate, Newsome, Huddersfield.

The next Excursion of the Union will be to Tebay (for Low Gill), August 3rd to 5th (Bank Holiday Week-end).

Circular 240.

Yorkshire Naturalists' Union.

President:

JOHN W. TAYLOR, Leeds.

Ex-Presidents:

John Gilbert Baker, F.R.S., F.L.S., Kew.
Rt. Hon. Lord Walsingham, M.A., F.R.S., Thetford, Norfolk.
Sir Ralph Payne Gallwey, Bart, M.B.O.U., Thirkleby Park.
Henry Eeles Dresser, F.L.S., F.Z.S., London.
R. H. Tiddeman, M.A., F.G.S., Oxford.
Robert Braithwaite, M.D., F.L.S., London.
Prof. W. Boyd Dawkins, M.A., F.R.S., Manchester.
William West, F.L.S., Bradford.
George T. Porritt, F.L.S., F.E.S., Huddersfield.
Prof. Percy F. Kendall, M.Sc., F.G.S., Leeds.
W. Denison Roebuck, F.L.S., Leeds.
A. H. Pawson, J.P., F.L.S., F.G.S., London.
G. W. Lamplugh, F.R.S., F.G.S., London.
W. Eagle Clarke, F.R.S.E., Edinburgh.
Charles Crossland, Halifax.
Dr. Wheelton Hind, M.D., B.Sc., F.G.S., Stoke-on-Trent.
W. H. St. Quintin, J.P., D.L., M.B.O.U., Scampston, York.
Prof. A. C. Seward, M.A., F.R.S.
Alfred Harker, M.A., F.R.S., Cambridge.

Divisional Secretary:

W. ROBINSON, Greenbank, Sedbergh.

Hon. Secretaries:

T. W. WOODHEAD, Ph.D., F.L.S., Technical College, Huddersfield.
W. E. L. WATTAM, 30 Towngate, Newsome, Huddersfield.

Hon. Treasurer:

H. CULPIN, 7 St. Mary's Road, Doncaster.

THE 240TH MEETING

WILL BE HELD AT

TEBAY

FOR LOWGILL,

FROM

Saturday, Aug. 3rd to Monday, Aug. 5th, 1912.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G C., G.N., H. & B., L. & Y., L. & N.W., Midland & N.E. Railways, which have booking arrangements for Tebay, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Tickets taken on Friday or Saturday, August 2nd and 3rd, will be available for returning any day up to and including Tuesday, August 6th, 1912. The N.E. Railway Co. issue cheap week-end tickets from all their stations other than Leeds, to Tebay, at a single fare for the return journey. Minimum 1st class fare being 4/-, and 3rd class fare 2/6, and these tickets avail for return to Wednesday, August 7th. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it. At Stations on the N.E. and H. & B. Railways, tickets at the reduced fares will be issued on production of the signed card of membership.

BOOKS AND MAPS.—Nearly the whole area is included in one inch sheet, No. 39, which may be had drift and geologically coloured (Quarter Sheet 98 N.E. old series). Six inch survey maps may be seen at the Cross Keys Hotel. The geology is described in some detail by the late J. G. Goodchild, in a guide J. W. Braithwaite published at Kirkby Stephen. Price 7d., free from the Author.

THE DISTRICT to be investigated is one of very special interest and is quite new to the Union. It comprises the head waters of the Lune and Eden, and the Geology and Botany will be unusually interesting.

Tebay is a junction on the London and North Western Railway, readily accessible from Darlington, cheap return week-end tickets being procurable from all stations on the North Eastern. There are express trains from Leeds to Penrith, via Ingleton, which may be found convenient in some cases; but re-booking thence to Tebay will be essential. There is also direct service from Leeds to Tebay via Ingleton or Carnforth. From Wensleydale changes must be made at Hawes Junction and Kirkby Stephen.

HEADQUARTERS.—The Cross Keys Hotel, Tebay. Bed, Breakfast and Dinner, 5/- per day. Members proposing to stay should write at once, as the accommodation is limited.

ROUTES.—On Saturday, August 3rd, Geologists will leave the Hotel at 9-30, and examine the Carboniferous conglomerates and lower shales to the east on the way to Pinsky Gill, near Newbiggin Station. On Monday, August 5th, they will proceed to Shap Granite Works and Quarries.

PERMISSIONS.—H. Goodwin, Esq., of Orton Hall, has kindly granted permission to visit his properties, and also invites members to inspect his Rock Garden. It is, of course, understood that great care will be exercised in not disturbing game birds. The Owners of the Shap Quarries will also welcome members in visiting their quarries and works.

GEOLOGY.—Mr. W. Robinson writes:—In and around Tebay we shall be centrally situate for examining the laccolitic Domes and tract of country which Dr Marr has made peculiarly his own Three of these Domes of Elevation, namely, the great central one of the Lake District; the northern block of the Pennine uplift; and, that comprising the Howgill Fells with the west side of Ravenstonedale, meet approximately hereabouts, and may be conveniently observed with their attendant lag faults, tear faults, and shatter belts.

On the upturned edges of the rocks which comprise the lower palæozoic series above referred to, and long æons of time before their elevation into Domes, the lower Carboniferous system was initiated and spread over the whole. Outliers of denuded beds may be seen in Grayrigg and neighbourhood.

To the north and east of Tebay, the Carboniferous are still well developed, and opportunity will be afforded to examine their basement beds which are well exposed, especially the red conglomerate and the lower limestone shales. In Pennyfarm Gill near Hebblethwaite Hall, some miles S.S.E, an undoubted nonconformity can be detected between the red conglomerate and a greenish coloured conglomerate immediately above containing white quartz pebbles which probably forms the true base of the Carboniferous system. It will be interesting if evidence of this unconformity can be discovered in the Birkbeck between Tebay and Shap, or on the left bank of the river Lune between Tebay and Ravenstonedale, as it is by no means settled whether the red conglomerate can definitely be assigned to the old red sandstone period or to the Carboniferous system

It is also interesting to observe that the granite boss whence the innumerable boulders of this remarkable rock, found all along the east coast of Yorkshire, on the Dogger Bank, and on the Lincolnshire side of the Humber, have originated, is within easy walking distance.

ARCHÆOLOGY.—Mr Robinson, writes:—Archæologists will be glad to know that the second Iter. of the Romans—the maiden way—passed through Tebay gorge by a bridge a mile and a half south of Tebay, whose abutment still remains, and part of the grouting of the bridge still adheres to the rock of the foundation.

The boundary walls of Low Boroughbridge Camp close by, are worthy of examination.

The extensive ruins of Shap Abbey, the only Abbey in Westmorland (with its Tower now tottering to its fall), in a deep and lovely valley, is within easy walking distance, and near to is Hawes Water and Kidsty Pike rarely seen by visitors to the Lakes, being out of the beaten track. Botanists could not select a more charming country.

Mr. Goodwin states that the beautiful and ancient church at Orton, is well worth a visit.

BOTANY.—The Botanical Section will be represented by Dr. T. W. Woodhead, F.L.S.

Mosses and Hepatics.—The Yorkshire Bryological Committee will probably be officially represented by the President, Mr. Wm. Ingham, B.A.

Mr. C. A. Cheetham writes:—The mosses of this district are of the Lake district type and so are of great interest to Yorkshire Bryologists. Black Force and Howgill Fells are good places, and such mosses as *Andreæa alpina*, *Oligotrichun incurvatum*, *Diphysicum foliosum* and its var. *acutifolium*, *Rhabdoweisia denticulata* and *R. fugax Grimmia conferta*, *Dicrano-dontium longifolium* var. *alpinum*, *Plagiobryum Zierii Dicranella secunda*, *Œdipodium Griffithianum*, *Anœctangium compactum Webera cruda Bryum Duvalii* and many others will repay the moss men's exertions.

MICRO-ZOOLOGY and BOTANY.—Mr. J. W. H. Johnson writes, that so far as he is aware the district has not been much worked in this section, and doubtless interesting records can be made.

VERTEBRATE ZOOLOGY.—This Section will probably be officially represented by Mr. Riley Fortune, F.Z.S.

Mr. Fortune writes:—The district is a very good one for bird life and many rare birds are to be found nesting. The time of year is not one of the best for observing bird life, but no doubt many interesting species will be seen.

Mammals.—The Otter is plentiful, and Foxes are fairly common. The Pine Marten and Polecat have been recorded from places not far away in recent years. The district is sufficiently wild to still harbour these rare British mammals. Not much has been done amongst the smaller mammals, information with regard to the Mice and Bats will be welcome. I have seen the Long-tailed Field Mouse, Field Vole and Common and Water Shrews. The Pipistrelle and Noctule Bats.

Birds.—The Peregrine Falcon, Buzzard and Raven yearly endeavour to nest in the district, but are unfortunately generally raided by collectors or the old birds shot by keepers. Kestrels are plentiful, and Sparrow Hawks are found in every suitable locality. The Merlin nests on the moors. Magpies and Carrion Crows (to be classed almost amongst the birds of prey) are fairly common. Tawny Barn and Long-eared Owls are to be found, and the Short-eared Owl has occasionally nested on the moors. Not far from Tebay there is a small colony of Black-headed Gulls and on the same moor Redshanks abound. Mallard and Teal also nest amongst the heather. Many interesting small birds are sure to be met with, notably the Pied Flycatcher, and by the banks of the stream Sandpipers, Kingfishers, Dippers and Grey Wagtails. The Yellow Wagtail is generally abundant, in the little plantations Goldcrests are common, and the Lesser Redpoll also nests in the district. There are one or two Heronries in the immediate neighbourhood, and some of the birds may usually be seen on the river banks

Reptiles and Amphibians.—I have not many notes on these classes but have seen the Adder and Common Lizard plentiful on the moors.

Fishes.—The district is well watered and Trout abound in all the mountain streams. In the Lune specimens of considerable size are frequently obtained. Salmon and Sea Trout are plentiful in their season. I have also seen the Minnow, Bullhead and Loach.

CONCHOLOGY.—Mr. John Wm. Taylor, the President of the Union, writes :—

The geological formation is largely Carboniferous. Only 18 land shells are actually known to occur in the immediate district, while the fresh-water species are apparently entirely unrepresented.

The known species inhabiting the district are *Arion ater*, *A. circumscriptus* and *A. intermedius*, *Limax agrestis*, *Hyalinia alliaria*, *H. nitidula*, *H. radiatula* and *H. crystallina*, *Pyramidula rotundata* and *P. rupestris*, *Helix aspersa*, *H. nemoralis* and *H. hortensis*, *H. elicigona arbustorum*, *Hygromia rufescens* and *H. hispida*, *Clausilia bidentata* and *Zua lubrica*.

Coleoptera.—Mr. M L. Thompson, F.E.S., writes :—No records for Coleoptera exist from Low Gill, but the following Beetles have been taken in the neighbourhood of Sedbergh not far distant—*Carabus catenulatus*, *Stomis pumicatus*, *Pterostichus vitreus*, *Bembidium atrocæruleum*, *Hydroporus morio*, *Hydroporus melanarius*, *Agabus guttatus*, *Staphylinus Stercerarius*, *Dianous cornlescens*, *Aphodius ater* (a form with dark red elytra), *Aphodius lapponum*, *Ccrymbites pectincornis Cychramus fungicola*, *Parnus auriculatus*, *Parnus prolifercornis*, &c.

ARACHNIDA.—Mr. Wm. Falconer states there are no records for Tebay.

PROGRAMME OF MEETINGS on Monday, 5th August.

5-45 p.m., Meat Tea, 1/6 each,
6-30 p.m., Sectional Meetings,
6-40 p.m., General Meeting,
} At Cross Keys, Hotel.

The Chair will be taken by the President of the Union.

Trains.—Last train for Darlington leaves at 7-37 p.m. Members for Leeds will have to leave earlier unless they return via Carnforth.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before August 15th, to W. E. L. Wattam, 30 Towngate, Newsome, Huddersfield.

NOTICES.

Marine Biological Committee.—The Annual Meeting will take place at Robin Hood's Bay, October 11th to 15th. Prof Garstang, of Leeds University, and Prof. Denny, of Sheffield University, have kindly consented to allow the use of the Marine Laboratory lately instituted there, as the centre for meetings and work. It is hoped that many members will avail themselves of the special opportunities of studying marine life in its various forms. All communications with respect to this meeting must be addressed to Rev. F H. Woods, B.D , Bainton Rectory, Driffield.

Mycological Committee.—The Fungus Foray at Mulgrave Woods, fixed for September 21st to 26th, will be held a week later, September 28th to October 3rd.

Circular 241.

Yorkshire Naturalists' Union.

President:

JOHN W. TAYLOR, Leeds.

Ex-Presidents:

John Gilbert Baker, F.R.S., F.L.S., Kew.
Rt. Hon. Lord Walsingham, M.A., F.R.S., Thetford, Norfolk.
Sir Ralph Payne Gallwey, Bart, M.B.O.U., Thirkleby Park.
Henry Eeles Dresser, F.L.S., F.Z.S., London.
R. H. Tiddeman, M.A., F.G.S., Oxford.
Robert Braithwaite, M.D., F.L.S., London.
Prof. W. Boyd Dawkins, M.A., F.R.S., Manchester.
William West, F.L.S., Bradford.
George T. Porritt, F.L.S., F.E.S., Huddersfield.
Prof. Percy F. Kendall, M.Sc., F.G.S., Leeds.
W. Denison Roebuck, F.L.S., Leeds.
A. H. Pawson, J.P., F.L.S., F.G.S., London.
G. W. Lamplugh, F.R.S., F.G.S., London.
W. Eagle Clarke, F.R.S.E., Edinburgh.
Charles Crossland, Halifax.
Dr. Wheelton Hind, M.D., B.Sc., F.G.S., Stoke-on-Trent.
W. H. St. Quintin, J.P., D.L., M.B.O.U., Scampston, York.
Prof. A. C. Seward, M.A., F.R.S., Cambridge.
Alfred Harker, M.A., F.R.S., Cambridge.

Hon. Secretaries:

T. W. WOODHEAD, Ph.D., F.L.S., Technical College, Huddersfield.
W. E. L. WATTAM, 30 Towngate, Newsome, Huddersfield.

Hon. Treasurer:

H. CULPIN, 7 St. Mary's Road, Doncaster.

THE 241ST MEETING

WILL BE HELD AT

SANDSEND,

(Near Whitby),

FOR A

Fungus Foray in Mulgrave Woods

AND ADJOINING DISTRICT,

From Saturday, Sept. 28th, to Oct. 3rd, 1912.

Chairman of Mycological Committee:

GEORGE MASSEE, V.M.H., etc., of the Royal Herbarium, Kew.

Hon. Secretary, Mycological Committee:

CHAS. CROSSLAND, 4 Coleridge Street, Halifax.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland & N.E. Railways, which have booking arrangements for Sandsend, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Tickets will be available for the outward journey from the 27th September to 3rd October, inclusive, and for return up to, and including

the 4th October. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fare being available for each stage of the journey.

The N. E. Rly. Co issue week-end tickets from all their stations on Friday, Saturday, and up to mid-day on Sunday to Sandsend, at a single fare for the double journey, minimum 1st class 4/-, 3rd class 2/6. The return journey can be made with these tickets on Sunday, Monday, or Tuesday.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it. At Stations on the N E. Rly. and H. & B. Rly , tickets at the reduced fares will be issued on production of the signed card of membership.

PERMISSION to pay a fifth visit to the majestic Mulgrave Woods has been granted by the Rev. the Marquis of Normanby. Last year it was again considered advisable to continue the investigation of these extensive woods for another season and then summarise the Mycological work done in this district by our Committee.

HEADQUARTERS are at Mrs. T. Kidd's, Normanby House, Sandsend. Members must write direct to Mrs. Kidd to secure accommodation. The Work Rooms are at the School close by, Monday, Tuesday and Wednesday.

ROUTES will be set out each morning.

PAPERS will be read, and Talks given as follow :—

Saturday Evening—

"Mycology, New and Old," by Mr. G. Massee.
"The Genus Tricholoma," by Mr. Alfred Clarke.

Monday Evening—

"The Sexuality of the Fungi," illustrated by the lantern, and
"A New Microchemical Reaction in certain Fungi," by Mr. Harold Wager, F.R.S.
"Some Notes on the Yeast Fungi," by Mr. F. A. Mason, F.R.M.S.

Tuesday Evening—

"The Capillitium of the Mycetozoa," by Mr. W. N. Cheesman, J.P., F.L.S.
"Pyrenomycetes and some problems suggested by them," paper prepared by Sir H. C. Hawley, Bart.

Wednesday Evening—

Summary of the results of previous investigations here, by the Secretary.
Exhibition of Lantern Slides of Fungi, by Mr. A. E. Peck.

Business Meeting, 8-30 p.m.

Miss Ivy Massee will have a series of coloured drawings for inspection. There will also be a few by Messrs. Clarke, Crossland and Gibbs.

Mycologists are requested to bring their Books, Microscopes, etc.

Yorkshire Marine Biology Committee.

Chairman - Prof. W. Garstang, M.A., F.Z.S., Leeds.
Convener - Rev. F. H. Woods, B.D., Bainton, Driffield.

A MEETING

Of the Marine Biology Committee will be held at

Robin Hood's Bay,

From Friday, Oct. 11th, to Tuesday, Oct. 15th, 1912.

Headquarters—Grosvenor Hotel.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N. W., Midland & N.E. Railways, which have booking arrangements for Robin Hood's Bay, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. The tickets will be available for the outward journey from the 10th to the 15th October, and will be available for returning any day up to and including Wednesday, October 16th, 1912. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

The N. E. Rly. Co. issue week-end tickets from all their stations on Friday, Saturday, and up to mid-day on Sunday to Robin Hood's Bay at a single fare for the double journey, minimum 1st class 4/-, 3rd class 2/6. The return journey can be made with these tickets on Sunday, Monday, and Tuesday.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it. At Stations on the N.E. and H. & B. Railways, tickets at the reduced fares will be issued on production of the signed card of membership.

In the daytime, especially the mornings when the tide is low, excursions will be made in search of forms of marine life, and each evening there will be discussions on the specimens collected. There will be lectures, probably, by Prof. Garstang and others.

Accommodation.—Suitable accommodation can be secured at the Grosvenor Hotel, very near the station, at 6/6 a day, but notice should be sent to Mr. Woods to reach him **not later than Thursday, October 10th**, stating the number of days for which accommodation is required.

A short account of the Marine Mollusca of Robin Hood's Bay, will be found in the June number of the Naturalist for 1907, but the collection of shells on that occasion was very hurried, and the description incomplete. The chief feature is the prominence of univalves, for the most part seaweed eaters, and the comparative absence of bivalves which mainly burrow in the sand. As far as molluses are concerned, and probably other forms of marine life, Robin Hood's Bay is practically new ground.

The Committee will be glad to welcome all who are interested in any branch of Marine Biology.

Circular 242.

Yorkshire Naturalists' Union.

President:
JOHN W. TAYLOR, Leeds.

Ex-Presidents:
John Gilbert Baker, F.R.S., F.L.S., Kew.
Rt. Hon. Lord Walsingham, M.A., F.R.S., Thetford, Norfolk.
Sir Ralph Payne Gallwey, Bart, M.B.O.U., Thirkleby Park.
Henry Eeles Dresser, F.L.S., F.Z.S., London.
R. H. Tiddeman, M.A., F.G.S., Oxford.
Robert Braithwaite, M.D., F.L.S., London.
Prof. W. Boyd Dawkins, M.A., F.R.S., Manchester.
William West, F.L.S., Bradford.
George T. Porritt, F.L.S., F.E.S., Huddersfield.
Prof. Percy F. Kendall, M.Sc., F.G.S., Leeds.
W. Denison Roebuck, F.L.S., Leeds.
A. H. Pawson, J.P., F.L.S., F.G.S., London.
G. W. Lamplugh, F.R.S., F.G.S., London.
W. Eagle Clarke, F.R.S.E., Edinburgh.
Charles Crossland, Halifax.
Dr. Wheelton Hind, M.D., B.Sc., F.G.S., Stoke-on-Trent.
W. H. St. Quintin, J.P., D.L., M.B.O.U., Scampston, York.
Prof. A. C. Seward, M.A., F.R.S., Cambridge.
Alfred Harker, M.A., F.R.S., Cambridge.

Hon. Secretaries:
T. W. WOODHEAD, Ph.D., F.L.S., Technical College, Huddersfield.
W. E. L. WATTAM, 30 Towngate, Newsome, Huddersfield.

Hon. Treasurer:
H. CULPIN, 7 St. Mary's Road, Doncaster.

THE 242ND MEETING
AND
51st ANNUAL MEETING,
WILL BE HELD AT
HULL
PRECEDED BY AN EXCURSION TO RYEHILL
for the investigation of the Glacial Beds at Kelsey Hill,
ON
SATURDAY, DEC. 14th, 1912.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland & N.E. Railways, which have booking arrangements for Hull, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. The Tickets will be issued on Friday, the 13th, and Saturday, the 14th December, and will be available for returning on Saturday, 14th, and up to and including the Monday, December 16th, 1912. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

At Stations on the North Eastern Railway, Week-end Tickets will be issued at single fare for the double journey (minimum 2/6 Third Class). Similar Tickets are issued from many Stations on other Companies' lines.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it. At Stations on the N E. Rly. and H. & B. Rly., tickets at the reduced fares will be issued on production of the signed card of membership.

PROGRAMME.

9-48 a.m.

A party of Geologists under the guidance of Mr. J. W. Stather, F.G.S., will visit the Kelsey Hill and Burstwick Gravel Pits, near Keyingham, where extensive sections in the Glacial Beds are exposed. These deposits are very fossiliferous, and, in the form of a range of low hills, extend across Holderness, and are said by Mr. Clement Reid, who surveyed them, to be of Interglacial Age.

Railway Arrangements.

Train leaves Paragon Station for Ryehill (Withernsea Line) at 9-48, returning at 1-36. Return Fare 1/7.

The Museums.

Those who cannot make it convenient to attend the above excursion will find much to interest them in the three Hull Museums.

1-0 p.m. to 2-15 p.m. Luncheon

Can be obtained at Field's Octagon Café, in King Edward Street, or any of the numerous restaurants in the city.

The 51st Annual Meeting

Will be held in the Museum of Natural History, Applied Art and Antiquities, Albion Street, by kind permission of the Hull Museums Committee, and in the Lecture Hall of the Royal Institution, by the kindness of the Hull Literary and Philosophical Society.

2-30 p.m. The Sectional Meetings

(which all Members and Associates are entitled to attend) will be held in the Royal Institution Lecture Hall for the election of Officers of Sections, and to receive the Annual Reports from the Secretaries.

3-0 p.m. The General Committee

(each member of which receives a special invitation with this circular), will meet to consider the Annual Report, elect Officers, and arrange the Excursion Programme for 1913.

5-0 p.m. Tea

can be obtained at Field's Octagon Café, King Edward Street (where tables will be reserved), or any of the numerous cafés in the city.

6-30 p.m. The General Meeting

of Members and Associates will be held in the Lecture Hall of the Royal Institution. The Chair will be taken by the President of the Union, who will be supported by prominent members. After the reading of the Annual Report, the announcement of the Excursion Programme for 1913, and the Election of New Members,

The Presidential Address

will be delivered by Mr. J. W. Taylor, Leeds; subject:—"DOMINANCY AND PHYLOGENY IN NATURE as affecting distribution" (with lantern illustrations).

During the delivery of the Address, the Chair will be occupied by His Worship the Mayor of Hull, Alderman J. Brown.

Conversazione.

After the delivery of the Presidential Address, a Conversazione (under the auspices of the Hull Scientific Club and Hull Geological Society) will be held in the Museum, by kind permission of the Hull Museums Committee, to which all Members and Associates of the Union are cordially invited.

Refreshments will be kindly provided by the Chairman of the Museums Committee (His Worship the Mayor) and Mrs. Brown.

Exhibition of Specimens.

A number of objects of interest will be on view, including collections of East Riding Plants, Insects, Shells, etc., specimens of "Moorlog" from the Dogger Bank, old types of Microscopes, and the Dobrée collection of European Noctuæ, in addition to an exhibition of Microscopic Slides by Members of the Hull Scientific and Field Naturalists' Club.

There will also be an exhibition of the publications of the Yorkshire Naturalists' Union, etc.

Associates intending to be present should apply to the Museum, Hull, for invitation cards. Acceptance should be sent not later than Thursday, December 12th.

The Municipal Museums, Hull.

Since the last meeting of the Union at Hull in 1902, two further Museums have been opened namely—The Wilberforce Museum in High Street, and the Museum of Fisheries and Shipping in the Pickering Park, Hessle Road.

The Museum of Natual History,

Applied Art and Antiquities, situated in Albion Street, contains the collections formerly in the Museum of the Literary and Philosophical Society, which dates back to 1823. In the Winter of 1831 the specimens were removed to the Assembly Rooms, in Jarratt Street. In June, 1855, they were removed to the newly built Royal Institution. Eventually the society presented the collection to the town, and on June 2nd, 1902, the Hull Municipal Museum was opened to the public. Since that time the Museum accommodation has been increased by the addition of three galleries. In this Museum are housed the Natural History collections, prehistoric and mediæval antiquities, ethnographical series, and objects illustrative of Applied Art. Special mention may be made of the Norman and Philip collections of Diatoms, Johnson Swales' collection of Eggs, the Boynton, Fortune and Pease collections of Birds, collection of East Yorkshire Mammals, Robson collection of English China, Stevenson collection of Beverley antiquities, Keyworth collection of casts of mediæval architecture, the prehistoric boat from Brigg, and the type specimen of *Sibbald's Rorqual* (*Balænoptera Sibbaldii*).

Wilberforce House, High Street.

The interesting Elizabethan Mansion in High Street, built by the Lister Family, was opened as a public Museum in August, 1906. In 1639 Charles I. was entertained here, and there is no doubt that Andrew Marvell was very familiar with the building. The house is dedicated to William Wilberforce, who was born here on the 24th of August, 1759, and was destined to do so much for the abolition of slavery. In addition to an extensive collection of Wilberforce relics, including his library, etc., the exhibits include slavery relics, mediæval pottery, Hull coins and tokens, and a fine collection of Hull views and plans dating from the time of Henry VIII.

The Museum of Fisheries and Shipping

situated on the Hessle Road, was opened to the public on March 30th, 1912. As its name implies, it is especially devoted to objects illustrative of the growth of the important Hull Fishing and Shipping Industries. The exhibits include various types of harpoons, models and paintings of whaling ships, Esquimaux relics, and skeletons of various species of Cetacea. The collection of models of ships is especially complete, and includes the various types of fishing craft from the old sailing smack to the most recent type of trawler, models of the early type of Humber paddle boats and steamers built in Hull, etc. At the close of the Japan-British Exhibition, the Japanese Government presented to the Museum a series of large scenic models illustrating different modes of fishing in Japan. The exhibits of natural history specimens are varied and numerous. An extensive series of fishes preserved in spirits has been presented by the British Museum.

Return Trains. N.E.R. Paragon Station.

Trains for Leeds, Bradford, Normanton, Sheffield and Huddersfield, leave at 8-40 p.m. ; Selby and York, 8-40, 11-25 ; Barnsley, 7-30, 9-20 ; Doncaster, Sheffield, 9-20 ; Driffield, Bridlington, 9-30, 10-57 ; Scarborough, 6-45.

H. and B. R. Cannon Street Station.

Train leaves for Howden, Cudworth, Rotherham, Sheffield, 11-0.

Election of Additional Members of General Committee.

Voting papers are not sent out this year, but members may vote by post card addressed to the Secretaries, The Technical College, Huddersfield, making their choice from the List of Members.

New Members.

A special effort is being made to get a good addition of members. Towards this the Hon. Secretaries would be glad to receive any nominations. The Subscription is 10/6 per annum, and members receive *The Naturalist*, *Transactions*, etc., free. The new volume of *The Naturalist*, commences on January 1st. A form of Nomination Paper is sent with this Circular.

CIRCULAR 243.

Yorkshire Naturalists' Union.

THE 243RD MEETING

WILL BE HELD AT

ROCHE ABBEY

For the investigation of Maltby Common and Woods,

ON

Easter Saturday, March 22nd, 1913.

RAILWAY ARRANGEMENTS.—Through return tickets at single fare and a third will be issued at all stations on the G C, G.N., H. & B., L. & Y., L. & N.W., Midland & N.E. Railways, which have booking arrangements for ROTHERHAM, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it.

BOOKS AND MAPS.—The district for investigation is included in Sheet 82 N.E. one-inch Ordnance Map (also published geologically coloured), as also are the six-inch Sheets 290 and 296. Reference may be made to Bohler's list of plants given in Aveling's History of Roche Abbey; "The Fungus Flora of Yorkshire," Massee and Crossland (Trans. Y.N.U. Parts 28 and 32); also Part 34, giving list of species noted at Maltby Fungus Flora; also "Naturalist" for November and December, 1905, pp. 337-340 and 367-370; T. H. Nelson's "Birds of Yorkshire" (1907); and Excursion Circular No. 125 (1896) and No. 191 (1905).

HEADQUARTERS.—The Lodge, Roche Abbey.

ROUTES.—A party will be formed at the Maltby Terminus under the guidance of Mr. Snelgrove and others on the arrival of visitors leaving Rotherham by the 10-10 tram. If desired a party wi l be made up to visit the New Colliery in Maltby Wood.

Conveyance.—Maltby is eight miles from Rotherham. There is a regular tram and trolley bus service. Single journey 6d. Trams (Broom Road) leave the bottom of Wellgate at 7-40 a.m. and every half-hour until 12-10, afterwards every 25 minutes. The journey occupies 38 minutes.

Accommodation.—Visitors desiring to stay the week-end may obtain private lodgings in the village. Mr. E. Snelgrove, Whiteley Wood, Sheffield, has a few addresses which he will be glad to supply to members in request.

In order to assist late arrivals a notice will be put up at Headquarters indicating as far as possible the route intended to be traversed.

PERMISSION to visit King's Wood and Roche Abbey has been kindly granted by the Earl of Scarborough, and for the garden and grounds at Firbeck, by Mr. W. C. Meredith.

Members are also invited to visit the Museum in Clifton Park. The Curator, Mr. H. Moore, F.R.M.S , writes:—This Museum was formerly the residence of and was built by Joshua Walker, Esq., in 1787. The property (56 acres) was acquired by the Rotherham Corporation and opened as a Public Park in 1892. The house was opened as a Museum in 1893. The collections consist of Art—(*a*) Paintings, Bronzes, Pottery, Metal Work, &c., lent by the Board of Education; (*b*) Private loans of Oil Paintings, Water Colours, Engravings and Pottery; (*c*) Reproductions of Sculptures and Bronzes; Natural History—Collections of local Birds, Eggs, and Lepidoptera lent by the Rotherham Naturalists' Society.

GEOLOGY.—The Geological Section will be officially represented by one of its Secretaries, Mr. C. Bradshaw, F.C.S.

Mr. Bradshaw writes:—The journey from Rotherham to Maltby, by way of Wickersley and Bramley, is over well-marked sandstones and shales near the top of the Middle Coal Measures Series. Alternation of these rocks gives that undulating aspect to the scenery which is characteristic of coal bearing strata. The first outcrop of sandstone crossed is the problematical Red Rock, upon which a considerable part of the town of Rotherham is built. This deposit, according to Green, occupies an eroded hollow in the underlying measures, to which it is unconformable. Its particular mode of sedimentation, and the exact phase of the coal measure period which it represents, have not yet been satisfactorily determined. No doubt, however, prevails as to the stratigraphical position of the Dalton Rock, and the succeeding well-known Wickersley Rock, which are also met with on the journey. All three sandstones have been quarried for building purposes, and for grindstones and other uses connected with the hardware industries.

The immediate neighbourhood of the meeting—Maltby and Roche Abbey—is occupied by Lower Magnesian Limestone, escarpments of which are observed, when approaching Maltby village, to give a somewhat bolder and more picturesque character to the landscape. This effect is appreciated more fully after passing through the old part of the village, and viewing the prospect from the left side of the valley through which the Maltby stream flows to Roche Abbey. Along this route weathered crags of limestone are very conspicuous, and several fairly good sections may be inspected. At Hooton Levitt Mill the stream is said to cut through the Magnesian Limestone to the coal measures beneath. Perhaps the best section of the dolomite rock occurs in a quarry just above the Abbey. Here can be seen, in process of quarrying, large blocks of stone that are removed without much difficulty. When fresh the rock is white, like chalk, with a fine crystalline texture, but it is rather soft for use in outdoor situations. On exposure its saccharine sparkle is soon lost, and the surface of the stone takes on a dull grey hue, which detracts from its appearance. Some beds rather lower down in the series, in the valley, are considerably harder and more compact. The amount of magnesium carbonate in the Lower Limestone has been found to reach as much as 40 per cent. There are no records of fossils from the beds referred to, but near Laughten-en-le-Morthen, Mr. Gibbs collected the following:—*Teribratula sp. Productus horridus, Sow., Monotus speluncaria, Schloth, Bakevellia ceratophaga, Schloth, Pleurotomaria antrina, Schloth, Turbo sp.* Fossils have also been found at the Brookhouse and Carr quarries.

In the seclusion of Maltby Wood, rather more than a mile away from the old village, the Maltby Main Colliery Co. have pierced the Permian strata and succeeded in reaching the Top Hard Bed or Barnsley Seam, of the Middle Coal Measures, which is now being brought to the surface and sent to the market. Railway enterprise has also linked up the several villages of the neighbourhood with trunk lines, and these industrial developments, while increasing the population of Maltby, have tended to minimise the natural attractions for which the locality is justly famous. The spoil heaps at the pit would probably yield coal fossils, and application has been made to the authorities for permission to examine them.

ARCHÆOLOGY.—The fine Cruciform Church at Rotherham has evidences of Norman work of the 12th Century. The Registers date back to 1540. There is an excellent guide to this Church published locally. The ancient Chapel of St. Mary on the Bridge, said to have been built in 1483, is also worth inspection. In the Clifton Park Museum are Roman remains from Templeborough. Of further interest is the ancient Cistercian Monastery of Roche Abbey, founded in 1147, which stands near the confluence of the streams from Maltby and Laughton.

BOTANY.—The Botanical Section will be officially represented by its President, Mr. E. Snelgrove, B.A.

Flowering Plants.—Mr. Snelgrove writes:—At this early date a long list of plants will serve no useful purpose. Generally speaking this is an exceedingly good district. The flora is rich and varied, and the following may be found in flower:—*Gagea lutea, Ornithogalum umbellatum, Daphne laureola, Helleborus viridis, Ribes alpinum. Ruscus aculeatus* grows on Maltby Common. *Erinus alpinus* on the walls of Roche Abbey.

Mosses and Hepatics.—Mr. Wm. Ingham, B.A., writes:—The following mosses grow at Roche Abbey. *Tortula pusilla, T. ambigua, Barbula rigidula. B. convoluta, Tortula intermedia, T. laevipila, Ditrichthum flexicaule, Weisia verticillata, Zygodon viridissimus, Ulota intermedia, Orthotrichum affine, Encalypta vulgaris, Bryum pseudo-triquetrum, Mnium stellare, Brachythecium populeum, Eurhynchium tenellum, Hypnum riparium* and *H. Schreberi.* At Maltby grow *Tortula rigida, Trichostomun tortuosum, Bryum bimum, Anomodon viticulsus, Eurhynchium Swartzii, Hypnum chrysophyllum* and *Hylocomium triquetrum.*

Hepatics.—At Roche Abbey may be found *Preissia quadrata, Alicularia scalaris, Haplozia riparia, Loptozia Muelleri, L. Excisa, Plagiochila asplenioides, Scapania nemorosa, Madotheca platyphylla, Radula complanata, Lejeunea cavifolia* and *Frullania dilatata.* The above Mosses and Hepatics indicate others in association but the district has not been well worked to show its capabilities.

Fungi.—The Yorkshire Mycological Committee will be officially represented by Mr. W. N. Cheeseman, J.P., F.L.S., Selby, and Mr. M. Malone, Bradford.

Mr. C. Crossland writes:—Little of anything beyond Micro-species will be found, but these are of much greater interest than larger kinds. *Pyrenomycetes* may be looked for on fallen branches, also on dead unfallen branches. January to April is the best time of the year for this class of fungi. *Mycetozoa* may also be looked for on rotting stumps, and fallen, rotting trunks and branches. A lengthy report of the Fungus Foray held in this district will be found in "The Naturalist" for 1905, pp. 337-340 and 367-370. The full list of Fungi found on that occasion may be consulted in the Transactions of the Y.N.U., Part 34.

MICRO-ZOOLOGY and BOTANY.—This Section will be officially represented by Mr. H. Moore, F.R.M.S., who writes:—The following Rotifera and Infusoria have been taken from Laughton Pond, Roche Abbey, and the Ponds on Maltby Common during the last ten years.

Rotifera.—*Anuraea aculeata, A. cochlearis, Asplanchna priodonta, Brachionus pala, Copeus Ehrenberghii, Conochilus volvox, Dinocharis pocillum, Euchlanis triquetra, Floscularia ornata, Hydatina senta, Melicerta ringens, M. tubicolaria, Limnias ceratophylli, Notens quadricornis, Notholea acuminate, N. scapha, Notommata aurita, Notops hyptopus, Oeciates crystallinus, Philodina roseola, Proales parasita, Polyarthra platyptera, Pterodina patina, Synchaeta pectinata, Stephanoceros Eichhornii.*

Infusoria (Flagellata).—*Authophysa vegetaus, Bods saltans, Englena viridis, Dinobryon sertularia, Peridinium tabulatum, Synura uvella, Uroglena volvox, Volvox globator.*

Infusoria (ciliata).—*Carchesium polypinum, Halteria grandinella, Nassula ornata, Opercularia nutans, Stentor polymorphus, Vaginicola crystallina, Vorticella nebulifera.*

VERTEBRATE ZOOLOGY.—The Vertebrate Section will probably be officially represented.

Mammals.—The Fox is common in the woods, being preserved; the Water Vole, Squirrel, Dormouse, Stoat and Weasel, and the Greater Horseshoe Bat also occur.

Birds.—The Kestrel, Sparrow Hawk, Green and Great Spotted Woodpeckers will doubtless be noticed. The Hawfinch frequents King's Wood. The Turtle Dove is common. The Coot and Mallard frequent Laughton Pond, and the Great Crested Grebe visit Sandbeck Ponds. Jackdaws inhabit the ruins of Roche Abbey.

Reptiles.—The Ringed Snake, Adder, and Slowworm may be met with.

CONCHOLOGY.—The woods and the neighbourhood of Maltby and Roche Abbey will be found productive of sylvan and limestone-haunting species, but very little has been done in the way of collecting in the district.

ENTOMOLOGY. — The Entomological Section will be officially represented by Mr. G. T. Porritt, F.L.S., F.E.S.

Coleoptera.—The Coleoptera Committee will probably be represented by Dr. H. H. Corbett, Mr. E. G. Bayford, F.E.S., and Mr. T. W. Wilshaw.

Mr. Bayford writes:—It is rather too early to expect many of the groups to be represented. Given a warm, sunny time, the best results will probably be obtained by confining the investigations to the *Adephaga*, keeping an eye open for species of other groups which may turn up, such as *e.g.*, *Coccinellidæ*, *Meloidæ*, and *Staphylinidæ*. In the woods bark-work should prove productive.

ARACHNIDA.—The Arachnida Committee will probably be represented by its Chairman, Mr. W. Falconer, who writes:—The district is one of the many in Yorkshire which has not yet been worked for its Spiders, but from its geographical position and surface features, say the woodlands in particular, species new to the County might confidently have been expected had not the season been too early for such to occur.

Programme of Meetings.

4-0 p.m., Meat Tea, 1/6 each,
4-45 p.m., Sectional Meetings,
5-0 p.m., General Meeting,
} All at the Lodge (Gate House), Roche Abbey.

The members who will require Tea should communicate at once with Mr. E. Snelgrove, Whiteley Wood, Sheffield.

The Chair will be taken by the President of the Union.

Trains.—From Rotherham, Mid. (Masborough) Leeds 6-59, 7-26, 8-24, York 6-47, York and Hull 8-43; Rotherham, G.C., Huddersfield, *via* Sheffield 7-5.

NOTICES.

The next Excursion of the Union will be to Kirkby Stephen, May 10th to 12th (Whit Week-end).

Notice is hereby given that a Special Meeting of the General Committee will be held at The Lodge, Roche Abbey, Rotherham, on Saturday, the 22nd March, 1913, at 5 p.m., in order to consider the substitution of the existing Rule as to the constitution of the Executive, by the following Rule, viz.:—"That the Executive shall consist of the President, the Ex-Presidents, the Presidents of Sections lettered B, C, D, E and F, the Honorary Secretaries, the Honorary Treasurer, the Divisional Secretaries, the Editors and Sub-Editors of "The Naturalist," the Soppitt Memorial Librarian, the Delegate to the British Association, together with a representative selected by each Section and Committee of Research."

Railway Facilities.—Members are particularly requested to note that the privilege hitherto granted by the North Eastern Company and Hull and Barnsley Company, that tickets could be obtained at Stations on those Company's lines at the reduced fare on production of the signed card of membership, is **withdrawn.** In future the arrangement from North Eastern and Hull and Barnsley Stations will be the same as from other Companies' Stations, through return tickets at single fare and a third issued on surrender of the Special Certificate signed by one of the Secretaries.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before March 31st, to W. E. L. Wattam, 30 Towngate, Newsome, Huddersfield.

Circular 244.

Yorkshire Naturalists' Union.

President:
HAROLD WAGER, F.R.S., F.L.S.

Ex-Presidents:
John Gilbert Baker, F.R.S., F.L.S., Kew.
Rt. Hon. Lord Walsingham, M.A., F.R.S., Thetford, Norfolk.
Sir Ralph Payne Gallwey, Bart, M.B.O.U., Thirkleby Park.
Henry Eeles Dresser, F.L.S., F.Z.S., London.
R. H. Tiddeman, M.A., F.G.S., Oxford.
Robert Braithwaite, M.D., F.L.S., London.
Prof. W. Boyd Dawkins, M.A., F.R.S., Manchester.
William West, F.L.S., Bradford.
George T. Porritt, F.L.S., F.E.S., Huddersfield.
Prof. Percy F. Kendall, M.Sc., F.G.S., Leeds.
W. Denison Roebuck, F.L.S., Leeds.
A. H. Pawson, J.P., F.L.S., F.G.S., London.
G. W. Lamplugh, F.R.S., F.G.S., London.
W. Eagle Clarke, F.R.S.E., Edinburgh.
Charles Crossland, Halifax.
Dr. Wheelton Hind, M.D., B.Sc., F.G.S., Stoke-on-Trent.
W. H. St. Quintin, J.P., D.L., M.B.O.U., Scampston, York.
Prof. A. C. Seward, M.A., F.R.S., Cambridge.
Alfred Harker, M.A., F.R.S., Cambridge.
John W. Taylor, Leeds.

Divisional Secretary:
W. ROBINSON, Greenbank, Sedbergh.

Hon. Secretaries:
T. W. WOODHEAD, Ph.D., F.L.S., Technical College, Huddersfield.
W. E. L. WATTAM, 30 Towngate, Newsome, Huddersfield.

Hon. Treasurer:
EDWIN HAWKESWORTH, Sunny Side, Cross Gates, Leeds.

THE 244TH MEETING

WILL BE HELD AT

KIRKBY STEPHEN

From WHIT-SATURDAY to WHIT-MONDAY,

10th to 12th May, 1913.

RAILWAY ARRANGEMENTS.—Through return tickets at single fare and a third will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland & N.E. Railways, which have booking arrangements for Kirkby Stephen, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

Tickets taken on Friday, Saturday, or Monday, May 9th to May 12th inclusive, will be available for returning any day up to and including Tuesday, May 13th, 1913.

N.B.—The Railway Companies will only grant these reduced fares to Members and Associates surrendering at the time of booking a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it.

BOOKS AND MAPS.—Nearly the whole area is included in Sheet No. 40, One-inch Ordnance Map (97 N.W. Old Series), which may also be had geologically coloured, and also Sheet 14, of the large sheet series. Six-inch maps can be seen at headquarters. The Geology is described in some detail by the late J. G. Goodchild, in a guide published by Mr. J. W. Braithwaite, Kirkby Stephen. Also included in the guide is a List of Plants, and varied information on places of interest in the immediate vicinity of Kirkby Stephen. The price of the guide is 7d., post free from the Author.

DISTRICT.—Kirkby Stephen is situate near to the Janet Scarp of the Pennines and not far from the Head Waters of the Rivers Swale and Yore which drain into the North Sea, and of the Eden and Lune which flow to Carlisle and Lancaster respectively. As the Yorkshire boundary is conveniently near opportunity is afforded to inspect parts of Yorkshire which the Association has not hitherto visited, and it has been suggested that opportunity should be taken to investigate the large Tarn at the head of Swaledale and the additional areas thereabouts. The train service is convenient, as Kirkby Stephen may be readily approached from Darlington, Tebay or Leeds.

HEADQUARTERS.—King's Arms Hotel, Kirkby Stephen. Tea, Bed and Breakfast, 6/6. Early application for rooms should be made direct to the proprietor, Mr. W. Hanson.

ROUTES.—It is suggested that the route on Saturday should be through Hartley to Stenkrith Bridge, thence to the Brockram Quarries.

On Monday to Birkdale Tarn in Swaledale, either direct or *via* Barras Railway Station and Tan Hill Collieries, where is the oldest and highest licensed public house in Great Britain (1,727-ft. above sea level). In either case traps will have to be provided so that the return may be over the Boundary Pass *via* Nateby.

In order to assist late arrivals a notice will be put up at Headquarters indicating as far as possible the route intended to be traversed.

PERMISSION.—Except the Brockram Quarries, for the viewing of which permission has been obtained, the whole of the area proposed to be visited is free.

GEOLOGY.—The Geological Section will be officially represented by one of its Secretaries, Mr. John Holmes and Mr. J. J. Burton, F.G.S.

Mr. W. Robinson writes that Kirkby Stephen stands on and is largely built of a brecciated conglomerate, locally known as Brockram (broken rock). This rock is the lowest of the Permians in the Vale of Eden, and rests unconformably on the Great Scar Limestone and on various members of the Yoredale series. The Brockram consists of angular fragments of limestone, and is embedded in a calcareous or sandy matrix. But how and in what way it came to assume that character has long puzzled Geologists, nor has it yet been adequately or satisfactorily explained or suggested. It was once thought the limestone fragments were ice borne and that glacial conditions prevailed; afterwards it was supposed that the fragments might have fallen as screes from the sides of lofty mountains into adjoining deep fiords, and now it is suggested that desert conditions may have prevailed, as the grains of sand of which the new red sandstones (Permian and Trias) mainly consist are rounded and polished, as are usually the components of sand tossed too and fro by desert winds One thing is certain, however, that a long interval of time must have elapsed between the termination of the carboniferous period and the formation of this singular rock. The Brockram thins out in the red sandstones to the North West, so that at Penrith the whole formation is represented as Penrith Sandstone. Perhaps, however, the most important geological feature seen in the neighbourhood of Kirkby Stephen is the huge fracture of the earth's crust, extending some 70 miles North and South, and throwing up one side or the other some thousands of feet. Towards the North the up-throw of this mighty mass is all on the East side of the fracture, whereas to the South of the area the up-throw is on the West side. The Town and the Brockram appear to cover the point where the change occurs. The cone measures are to be seen at Tan Hill on the high ground to the East of Kirkby Stephen. They were, of course, laid down long anterior to the Brockram.

ERRATA. Page 2.

Line 9 from top, for " Janet " read " Fault."
Line 15 from top, for " additional " read " altitudinal."
Line 3 from bottom, for " cone " read " coal."

Mr. E. Hawkesworth writes:—The Lower Carboniferous Rocks are described in detail in a masterly and exhaustive paper by Professor E. J. Garwood, published in the "Q.J.G.S.," December, 1912. Sections are numerous and fossils abundant, and with Professor Garwood's paper in hand, one cannot imagine that a more profitable and pleasant time would be spent than in working out the sections, zone by zone.

BOTANY.—The Botanical Section will be officially represented by the President of the Union and Dr. T. W. Woodhead, F.L.S.

Flowering Plants.—The district to be investigated will doubtless prove interesting botanically. The following records are culled from a list of plants prepared by Mr. J. B. Davis, included in the guide before referred to, viz.: *Ranunculus aquatilis, Trollius europæus, Helleborus fœtidus, Meconopsis cambrica, Chelidonium majus, Draba incana, Thlaspi arvense, Reseda lueteola, Viola hirta, V, odorata, Hypericum hirsutum, Radiola millegrana, Geranium sanguineum, G. rotundifolium, G. lucidum, Empetrum nigrum, Genista tinctoria, G. anglica, Trigonella ornithopodioides, Rubus chamæmorus, R. saxatilis, Alchemilla alpina, Saxifraga aizoides, S. granulata, Hippuris vulgaris, Epilobium angustifolium, E. parviflorum, Sanicula europæa, Myrrhis odorata, Asperula odorata, Sherardia arvensis, Valeriana dioica, Scabiosa Columbaria Antennaria dioica, Campanula latifolia, C. glomerata, Vaccinium Vitis-Idaea, V. oxycoccos, Menyanthes trifoliata, Polemononium cæruleum, Echium vulgare, Myosotis repens, Linaria cymbalaria, Veronica serpyllifolia, V. montana, V. spicata, Lathræa squamaria, Pinguicula vulgaris, Primula elatior, P. farinosa, Polygonum viviparum, Juniperus communis, Orchis mascula, O. morio, O. ustulata, Iris Pseudo-acorus, Potamogeton crispus, P. densus, Allium oleraceum, Gagea lutea, Eriophorum vaginatum, E. angustifolium, Rhyncospora alba, Carex pulicaris, C muricata, C. præcox, Koeleria cristata.*

Ferns.—*Crpyptogramme crispa, Asplenium Ruta-muraria, A. Trichomanes, A. viride, A. Adiantum-nigrum, Scolopendrium vulgare, Cystopteris fragilis* and var. *dentata, Aspidium aculeatum, Lastræa oreopteris, Polypodium vulgare, P. Phegopteris, P. Dryopteris, P. calcareum, Ophioglossum vulgatum*, and *Botrychium lunaria.*

Lycopodiaceæ.—*Lycopodium clavatum, L. alpinum, L. inundatum, L. selago, Isoetes lacustris.*

Mosses and Hepatics.—W. Ingham, B.A., writes:—The following species all grow South of Kirkby Stephen, round about Mallerstang.

Mosses.—*Ditrichum flexicaule, Dicranella varia, Campylopus flexuosus, Dichodontium pellucidum, Tortula subulata, Weisia microstoma, W. calcarea, W. æruginosa, W. verticillata, Trichostomum tortuosum, Barbula revoluta, Cinclidotus fontinaloides, Encalypta vulgaris, Grimmia apocarpa, Rhacomitrium aciculare, Zygodon viridissimus, Orthotrichum affine, O. cupulatum, O. stramineum, Webera albicans,* fruiting (rare), *Bryum inclinatum, B. intermedium, Mnium rostratum, Leucodon sciuroides, Cylindrothecium concinnum, Climacium dendroides, Isothecium myurum, Orthothecium intricatum, Eurhynchium striatum, E. crassinervium, E. piliferum, E. pumilum, E. rusciforme, Plagiothecium depressum*, and *Hylocomium brevirostre. Tortula intermedia, Encalypta streptocarpa* and *Anomodon viticulosus* grow at Kirkby Stephen, and *Orthotrichum pulchellum* at Pendragon Castle.

Hepatics.—*Frullania Tamarisci* and *Conocephalum conicum* at Mallerstang, and *Madotheca platyphylla* at Kirkby Stephen.

Mr. A. Cheetham writes:—The neighbourhood of Kirkby Stephen affords excellent working ground for the Bryologist. On the Fells on either side of the Mallerstang *Dicranodontium longirostre var. alpinum* is to be seen at its best, in great sheets of fine growth. On the summit of Wild Boar Fell the *Andreæas* will repay the climber, the variety *falcata* of *A. Rothii* shows almost typical leaves of *A. crassinervia.* On the trees further up the river large tufts of *Orthotrichum Lyellii* occur, and in the deep ghylls, such as Hell Ghyll, many of our rarer mosses are to be found, such as *Plagiobryum Zierii, Orthothecium intricatum* and *Bartramia Œderi.* Other mosses which are found in the surrounding districts and should occur here are *Rhabdoweisia fugax, R. denticulata, Fissidens osmundoides, Barbula rubella* var. *ruberrima* (Augill, Brough), *Weissia crispata, Anœctangium compactum* (c. fr. Ratheydale), *Splacnum sphæricum, Webera cruda, Neckera pumila, Antitrichia curtipendula* and *Hypnum vernicosum.*

Fungi.—The Yorkshire Mycological Committee will be officially represented by Mr. M. Malone.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will be officially represented by its General Secretary, Mr. A. Haigh Lumby.

Mammals.—Mr. Riley Fortune, F.Z.S, writes:—There are very few records of the smaller mammals of the district and information respecting them, and of the Bats in particular, would be welcome. The Fox is common, and the Otter fairly so. The Badger also occurs. Of the smaller mammals I have seen the Water Vole, Field Vole, Bank Vole, Common and Water Shrews, Long-tailed Field Mouse, Weasel and Stoat.

Birds.—The district is rich in bird life, and in the neighbourhood the Peregrine Falcon still breeds, and also the Raven. Both Sparrow Hawk and Kestrel are plentiful. On the moors may be seen the Merlin, and the usual moorland species, including the Dunlin. Sunbiggan Tarn is the home of the Black-headed Gull, and on the moors surrounding the Redshank occurs. The Mallard nests here, also the Teal, and the Water Rail and Short-eared Owl have also nested in the immediate vicinity. Near Musgrave there is a Heronry of considerable size, and as the nests are mostly in low trees, they are handy for observation. On the banks of the streams the Dipper, Kingfisher and Grey Wagtail are plentiful; the Yellow Wagtail seems to have a partiality to the railway embankments. Amongst the nesting species may be mentioned the Lesser Redpoll, Pied Flycatcher, Green and Great Spotted Woodpeckers, Creeper, Tawny and Long-eared Owls, Wheatear and Ring Ouzel.

Fishes.—Trout are abundant, and Grayling also in some parts, where they are considered a nuisance. I have also seen the Minnow, Loach and River Bullhead. Salmon and Sea Trout are also found in the neighbourhood in their season.

Reptiles and Amphibians.—The only members of these groups I have seen are Adder, Lizard, Frog, Toad, and Great Crested Newt.

ENTOMOLOGY.—The Entomological Section will probably be officially represented.

Coleoptera.—The Coleoptera Committee will be officially represented by Mr. M. L. Thompson, F.E.S., who writes:—No systematic investigations have been made of the Beetles of this district, but *Carabus nitens*, *Dianous cærulescens* and *Stenus guttula* occur in the neighbourhood of Keld. Most interesting work, however, can be done at this time of the year amongst the moorland and mountain species of N.W. Yorkshire, especially in the families *Carabidæ* and *Dytiscidæ*.

ARACHNIDA.—The Arachnida Committee will be officially represented by Mr. W. P. Winter, B.Sc.

Mr. W. Falconer writes:—Many years ago Mr. F. O. P. Cambridge investigated the lower portions of the Eden Valley ("Araneidea of Cumberland and the Lake District," *Naturalist*, January, 1895, pp. 29-48), and no doubt many of the same species will again be observed. The neighbourhood of Kirkby Stephen in the Upper Valley was not visited, but there is much favourable ground on both the Westmoreland and Yorkshire sides of the border. The nearest records, but from a different geological formation, and at a different season of the year, were made during the visit of the Union to Tebay last year (*Naturalist*, October, 1912, pp. 304-5). Upwards of 20 miles N.W. of Kirkby Stephen is the noted Newtown Moss, near Penrith, where so many rare spiders occur, viz.:—*Taranucnus setosus* Camb., *Bathyphantes setiger* F. O. P. Cb., *Mengea warburtonii* Camb., *Ceratinella scabrosa* Camb., *Araeoncus crassiceps*, Westr., *Thanatus striatus* C. L. Koch, *Sittieus caricis* Westr., and others.

Programme of Meetings on Whit-Monday.

4-15 p.m., Meat Tea, 1/9 each.
4-45 p.m., Sectional Meetings.
5-0 p.m., General Meeting.

The Chair will be taken by the President of the Union.

Trains.—From Kirkby Stephen: Leeds, Bradford, &c., 5-40 and 5-54 p.m. York, 5-21 p.m.

NOTICES.

The next Excursion of the Union will be to Burnsall on Saturday, 7th June.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before May 20th, to W. E. L. Wattam, 30 Towngate, Newsome, Huddersfield.

CIRCULAR 245.

Yorkshire Naturalists' Union.

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RILEY FORTUNE, F.Z.S., 5 Grosvenor Terrace, East Parade, Harrogate.

Hon. Secretaries:

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W. E. L. WATTAM, 30 Towngate, Newsome, Huddersfield.

Hon. Treasurer:

EDWIN HAWKESWORTH, Sunny Side, Cross Gates, Leeds.

THE 245TH MEETING

WILL BE HELD AT

BURNSALL

On SATURDAY, JUNE 7th, 1913.

RAILWAY ARRANGEMENTS.—Through return tickets at single fare and a third will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland & N.E. Railways, which have booking arrangements for GRASSINGTON or BOLTON ABBEY, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

Tickets taken on Friday or Saturday, June 6th or 7th, will be available for returning from either station any day up to and including Monday, June 9th, 1913.

N.B.—The Railway Companies will only grant these reduced fares to Members and Associates surrendering at the time of booking a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it.

BOOKS AND MAPS.—The District for investigation is included in Sheet 69 One-inch Ordnance Map, Small Sheet Series, and Sheet 25, One-inch Map, Large Sheet Series (also published geologically coloured), and in Sheets 134 and 151 of the Six-inch Map. The following works may also be consulted—Geographical Distribution of Vegetation in Yorkshire, Harrogate, and Skipton District, by Smith and Rankin; F. A. Lee's "Flora of the West Riding"; "The Birds of Yorkshire," by T. H. Nelson, M.B.O.U.; Y N U. Circulars No. 118 (September, 1895), and No. 206 (September, 1907); "The Fungus-Flora of Yorkshire," Massee and Crossland, Parts 28 and 32, Trans. Y.N.U. 1902 and 1905.

HEADQUARTERS.—Fell House Hotel, Burnsall.

ROUTES.—The Geologists, under the guidance of Dr. Albert Wilmore, F.G.S., will start from Rylstone Station on arrival of 9-1 a.m. and 1-30 p.m. trains, and follow out the programme mentioned below. Walking distance, morning, 5 miles; afternoon, 5½ miles to Burnsall. The general body of Naturalists will go forward by the train due at Grassington at 9-9 a.m. and choose their own routes on arrival there. Mr. T. Roose, of Bolton Abbey, will act as guide for the Vertebrate Section. Later arrivals will find excellent working ground from either Bolton Abbey or Grassington to Burnsall.

Motor Buses meet the principal trains at Grassington and Bolton Abbey.

In order to assist late arrivals a notice will be put up at Headquarters indicating as far as possible the route intended to be traversed.

PERMISSION to visit the estates (except the meadows) of the Duke of Devonshire has kindly been granted by his Agent, Mr. A. Downs, and also by Colonel Dawson to visit his grounds at Hartlington. Members are particularly requested to note that they must not trespass in the meadows.

GEOLOGY.—The Geological Section will be officially represented by one of its Secretaries, Mr. John Holmes, and Mr. Edwin Hawkesworth.

Albert Wilmore, Esq., D Sc.., F.G.S., writes:—Starting at the above-mentioned times the Geologists will proceed to Hetton and Winterburn to see the Lower Carboniferous Limestone—that is the Tournaisian Beds. These are dark, fine-grained limestones, quite different from the Knoll limestones to be seen in the afternoon. The most striking fossils are *Caninia gigantea*, *Syringopora reticulata*, *Michelinia sp.* (*cf. megastoma*), *Chonetes cf. comoides*, *Productus pustulosus*, *Productus semireticulatus*. These beds are probably on the horizon C. of Dr. Vaughan. If time permits, also visit the very fossiliferous beds near the Dales Railway, one mile from Rylstone.

Meet the afternoon party at Rylstone Station at 1-30; examine Cracoe Gill, where beds with D. fossils are exposed In Threapland Gill the Viséan beds are slightly folded, and some shales of the Pendleside facies may be seen. Afterwards visit the great dissected Knoll at Swinden, now being quarried by Messrs. P. and W. Spencer. Characteristic knoll structure and knoll fossils may be seen; the latter may usually be obtained in plenty. It will be possible to discuss with advantage the problem of the origin of the knolls. Afterwards visit the Catchall Railway Cutting to see the folded knoll beds, and from these proceed along the line of the Craven Fault from Linton to Burnsall. Evidence of the Fault is most clearly seen. Close to Burnsall, folded beds with *Lithostrotion junceum* may be seen. The return may be made to Grassington or Rylstone Station according to circumstances.

The strata seen are approximately as follows:—*Pendleside facies*—Shale beds. *Dibunophyllum* Zone—Knoll beds. *Seminula* or *Lithostrotion* Zone—Knoll beds. *Caninia* Zone—Dark, well-bedded limestone.

There are also interesting glacial and alluvial deposits, as well as problems of river capture and changes of drainage to be studied.

BOTANY.—The Botanical Section will be officially represented by one of its Secretaries, Mr. C. A. Cheetham.

Flowering Plants.—Mr. J. Beanland writes:—The season is late so that many plants will be in blossom that would otherwise have been normally over. The following species will doubtless be met with, viz.:—*Trollius europæus, Arabis saggitata, Cochlearia alpina, Thlaspi alpestre* var. *occitanum, Helianthemum chamæcistus, Viola hirta, Arenaria verna, Geranium sylvaticum, G. lucidum, Poterium officinale, Pimpinella saxifraga, Antennaria dioica, Carlina vulgaris, Primula farinosa, Pedicularis palustris, Daphne Laureola, Habenaria conopsea, H. chloroleuca, Convallaria majalis, Paris quadrifolia, Sesleria cærulea, Melica nutans.*

Mosses and Hepatics.—Mr. Wm. Ingham, B.A., hopes to be present.

Mr. C. A. Cheetham writes:—The Bryologists have a good opportunity to work the limestones in Troller's Gyll, and also the grit rocks on the hills above, and thus get further insight into the groups of mosses peculiar to these rocks. On the grits *Leptodontium flexifolium* will probably be found fairly common, and possibly *Andreæa Rothii* var. *grimsulana*, both of which occur in similar situations on Beamsley Beacon some miles further down. At West end, over the hills, I have frequently gathered *Dicranella squarrosa* in fruit.

Fungi.—The Yorkshire Mycological Committee will be officially represented by Mr. M. Malone.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will be officially represented by its President, Mr. H. B. Booth, F.Z.S., M.B.O.U., and two of its Secretaries, Mr. Riley Fortune, F.Z.S. and Mr. A. Haigh-Lumby.

Birds.—Mr. H. B. Booth writes:—Burnsall is an excellent centre for the student of Ornithology, both for the birds of the valley and the birds of the moorland. I have known the following species to nest within a short distance from the village—some of them not uncommonly—Pied Flycatcher, Yellow and Grey Wagtails, Dipper, Lesser Whitethroat, Wood Warbler, Blackcap, Garden Warbler, Goldcrest, Greater-spotted Woodpecker, Creeper, Redstart, Whinchat, Wheatear, Tree Pipit and Lesser Redpole. On the higher ground the Merlin endeavours to nest each year, but is usually destroyed by the gamekeepers. Other species that are not at all uncommon are the Tawny and Long-eared Owls (the Short-eared Owl occurs in the Autumn, and has been reported to have nested once), Curlew, Golden Plover and Carrion Crow (a white one was hatched in 1906), Marsh Tits (or are they Willow Tits?) are common in the Fir Woods below Burnsall Fell. The Pheasant and Partridge are noteworthy by the scarcity of their numbers, but Red Grouse are abundant on the moor.

Mammals.—Very little is known of the Bats (which are comparatively scarce) in this immediate locality; but Daubenton's Bat is common so far up the Wharfe as Bolton Abbey, and the Whiskered, Noctule, Pipistrelle and Long-eared Bats have all been obtained within a few miles of Burnsall. Hedgehogs are comparatively common, and I have heard Otters calling and whistling from the river at Loup Scar (close to the village). The Badger, although scarce, has been reported, and more than one female with her litter of young has been dug from her "earth" on Rylstone Fell, near by. The Stoat and Weasel appear to hold their ground in spite of traps.

Reptiles.—The Viper occurs on Burnsall Fell and on Barden Moor. A few years ago the Slow-worm was quite common at two places near to Burnsall, but their numbers have been greatly decimated by trippers. Both these reptiles are very local in this district. The Palmated Newt occurs on Barden Moor, and probably in other suitable spots in the neighbourhood.

Fishes.—The usual Upper-Wharfe fishes occur in the river, and Burnsall enjoys a small stretch of free fishing from the village green. I have never been able to find any trace of the Common Stickleback in this neighbourhood.

CONCHOLOGY.—Mr. W. Denison Roebuck, F.L.S., writes:—Conchologists will find this district very rich. They will do well to explore the romantic gorge of Troller's Gyll and Skyreholme Mill Dam, near Appletreewick, where numerous species of Calcareons proclivities occur, such as *Azeca tridens, Pyramidula rupestris*, etc.

ENTOMOLOGY.—The Entomological Section will be officially represented by Mr. J. W. Carter, F.E.S., and Mr. G. T. Porritt, F.L.S., F.E.S.

Coleoptera.—The Coleoptera Committee will be officially represented by its Chairman, Mr. J. W. Carter, F.E.S., who writes:—The following species of Beetles besides a host of commoner ones have been recorded for the Wharfe valley between Bolton Woods and Grass Woods inclusive:—*Cychrus rostratus L.*, *Carabus monilis F.*, *Leistus rufescens F.*, *Elaphrus cuprens, Duft*, *Bradycellus cognatus, Gyll*, *Bembidium stomoides Dj*, *Trechus rubens F.*, *Cymindis vaporariorum L.*, *Homalota pavens Er.*, *Quedins fuliginosus Gr.*, *Philonthus puella Nor.*, *Anthobium ophthalmicum Pk.*, *Epurea melina Er.*, *E. oblonga, Hbst.*, *E. longula Er.*, *Serica Brunnea L.*, *Sinodendron cylindricum L*, *Throscus carinifrons, Bonv.*, *Elater Balteatus L.*, *Sericosomus brunneus L.*, var. *fugax F.*, *Corymbites pectenicornis L.*, *C. crupeus F.*, and its var. *æruginosus F.*, *C. æneus L.*, *Dascillus cervinus L.*, *Helodes minuta L.* and *marginata F.*, *Podabrus alpinus, Pk,*, *Telephorus pellucidus F.*, and *T. thoracicus, Ol.*, *Malthodes marginatus Lat.*, *Toxotus meridianus L.*, *Phytodecta pallida L.*, *Polydrusus micans F.*, *Orchestes fagi L.*, *Alophus triguttatus F.* Mr. Ray Hardy has recently recorded (*Lancashire Naturalist*) the occurrence in Bolton Woods of *Rhopalomesites tardyi, Curt.*

Neuroptera and Trichoptera.—Mr. G. T. Porritt writes:—The River Wharfe in the Burnsall District is splendid ground for the Trichopterist, and at the time of the excursion the following, among very many other species, will probably be on the wing there, most of them in plenty, viz :—*Perla maxima*, *P. cephalotes*, *Nemoura meyeri*, *Drusus annulatus*, *Lasiocephala basalis*, *Leptocerus annulicornis*, *Tinodes wæneri*, *T. dives*, *Glossosoma vernale* and *Agapetus comatus.*

ARACHNIDA.—The Arachnida Committee will be officially represented by Mr. W. P. Winter, B.Sc.

Mr. W. Falconer writes:—In the immediate neighbourhood of Burnsall very little collecting has been done, and only common species have so far been obtained. but places in the same district, *e g.*, Bolton Woods and Grass Wood have received more attention, and several of the rarer Yorkshire species are on record for them, viz.:—*Dysdera crocota*, C. L. Koch, *Prosthesima latreillii*, C. L. Koch, *Robertus neglectus*, Cb., *Leptyphantes tenebricola*, Wid., *Syedra innotabilis*, Cb., *Styloctetor penicillatus*, Westr., *Tapinocyba pallens*, Cb., *Micrommata virescens Clerck* (Grass Wood, the only N. British Station), and others.

PROGRAMME OF MEETINGS:—

3-45 p.m., Meat Tea, 2/- each.
4-30 p.m., Sectional Meetings.
4-45 p.m., General Meeting.

At the Fell House Hotel, Burnsall.

The Chair will be taken by the President of the Union.

Trains.—From Grassington to Leeds and Bradford, 6-38 and 7-55 p.m. From Bolton Abbey to Leeds and Bradford, 7-12, 7-35 and 8-11 p.m.

Arrangements will be made for Motor Buses to convey members to the station at night.

NOTICES.

The next Excursion of the Union will be to Stamford Bridge, on Saturday, 5th July.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before June 17th, to W. E. L. Wattam, 30 Towngate, Newsome, Huddersfield.

Circular 246.

Yorkshire Naturalists' Union.

THE 246TH MEETING

WILL BE HELD AT

STAMFORD BRIDGE

On SATURDAY, JULY 5th, 1913.

RAILWAY ARRANGEMENTS.—Through return tickets at single fare and a third will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland & N.E. Railways, which have booking arrangements for Stamford Bridge, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

Tickets taken on Friday or Saturday, July 4th or 5th, will be available for returning from either station any day up to and including Monday, July 7th, 1913.

The N.E. Rly. Co. issue cheap week-end tickets from all their stations, at a single fare for the double journey. Minimum—1st class fares 4/-; and 3rd class 2/6.

N.B.—The Railway Companies will only grant these reduced fares to Members and Associates surrendering at the time of booking a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it.

BOOKS AND MAPS.—The district for investigation is included in Sheet 158 of the six-inch Map, and Sheet 93 N E. (new series, Sheet 63), of the one-inch Ordnance Map, which is also published geologically coloured.

Reference may be made to J. F. Robinson's "Flora of the East Riding of Yorkshire"; T. H. Nelson's "Birds of Yorkshire" (1907); "The Fungus Flora of Yorkshire," Massee and Crossland (Trans. Y.N.U. Parts 28 and 32); and The British Association Handbook, York Meeting, 1906.

HEADQUARTERS.—Bay Horse Inn, Stamford Bridge, near the Station.

DISTRICT.—Mr. S. H. Smith writes:—The district to be traversed is situated eight miles North East from York, and is but a short distance from the foot of the well-known Wold Hill of Garrowby. The village is upon the East bank of the River Derwent, and its name recalls the famous battle fought there in September, 1066. The route to be followed by the members of the Union will be by pleasant stretches of water fringed with alders, a succession of delightful pictures culminating in a charming scene at the Lock House and weir. On the left stands Aldby Park, famous as the residence of an old Yorkshire family, the Darley's, and as a Roman Station, and of being the site of a Royal Villa belonging to the Kings of Northumbria. Proceeding through the noble park at Aldby the path leads through a succession of sylvan groves that hold rich treasures according to the desire of the naturalist, and ultimately the party will emerge upon the road leading through the well-known Buttercrambe Woods, back to headquarters.

ROUTES.—On the arrival of the trains at Stamford Bridge, due from Hull at 9-16 a.m., and from York at 9-27 a.m., the party will proceed under the guidance of Mr. S. H. Smith, by way of the right bank of the River Derwent to Buttercrambe Bridge, then through Aldby Park, returning to headquarters through Buttercrambe Woods. Distance about 7 miles. The Geologists will select their own route.

PERMISSION to visit Aldby Park has kindly been granted by Major W. H. Collins.

GEOLOGY.—The Geological Section will be officially represented by Mr. J. W. Stather, F.G.S., who writes:

The Vale of York is a very broad and ancient valley excavated in the soft sandstones and marls of the Permian and Triasic series, which in the neighbourhood of Stamford Bridge are entirely covered by superficial deposits, consisting for the most part of Glacial accumulations.

As Prof. Kendall has many times pointed out, there are in this district, two distinct terminal moraines which mark phases in the retreat, or possibly advance, of the Vale of York glacier. They extend as perfect and nearly parallel crescentic mounds nearly from the foot of the Wolds, round to the outcrop of the Magnesian Limestone.

The more southerly of these moraines can be examined at High Catton, near Stamford Bridge, where excellent sections may be seen in a series of gravel pits Amongst the morainic material of the Vale of York many rocks from far distant localities have been recognised, such as Granites from Galloway, Brockram and the Dufton "Granite" from the Vale of Eden, and various igneous rocks from the Lake District, such as the Diorite of Carrock Fell, the Quartz Porphyry of Threlkeld, and the well-known Granite of Shap Fell. The Whin Sill is also well represented.

BOTANY.—The Botanical Section will be officially represented by Dr. T. W. Woodhead, F.L.S.

Flowering Plants.—Mr. H. J. Wilkinson writes:—By the right side of the River Derwent, and in Buttercrambe Woods and Aldby Park, V.C. N.E. 62, some interesting plants have been recorded:—*Thalictrum flavum*, *Corydalis claviculata*, *Nasturtium sylvestris*, *N. palustris*, *Barbarea vulgaris*, *Stellaria aquatica*, *S. palustris*, *Hypericum elodes*, *Geum rivale*, *Drosera rotundifolia*, *Valeriana officinalis*,

Pyrola minor, Hottonia palustris, Lysimachia vulgaris, Menyanthes trifoliata, Pinguicula vulgaris, Scutellaria galericulata, Orchis incarnata, O. mascula, O. Morio, Narthecium ossifragum, Butomus umbellatus.

Ferns.—The following species occur:—*Athyrium Filix-fœmina, Lastrea Thelypteris, L. spinulosa, L. aristata, Polypodium vulgar, P. Phegopteris, P. Dryopteris.*

Mosses and Hepatics.—Mr. Wm. Ingham, B.A., who will be present, writes:—Close by Stamford Bridge the following mosses may be found:—*Campylopus pyriformis* in fruit, *Fissidens bryoides* and *F. taxifolius, Barbula cylindrica, Weisia viridula, Cinclidotus fontinaloides, Brachythecium rutabulum, forma,* and *Hypnum palustre var. laxum.* In the woods close by is a curious growth of *Leucobryum glaucum.* This grows in rounded bosses of various sizes, which detach themselves from the soil, and lie loose on the surface under the trees, no doubt due to the dripping of the raindrops through the leaves of the trees above. They are beautifully rounded, and may be used as natural pincushions.

No Hepatics are on record for the immediate district.

Fungi.—The Yorkshire Mycological Committee will be officially represented by Mr. W. N. Cheesman, J.P., F.L.S.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will be officially represented by its President, Mr. H. B. Booth, F.Z.S., M.B.O.U., and Messrs. Riley Fortune, F.Z.S., and S. H. Smith. Mr Sydney H. Smith, writes:—

Mammals.—The district is rich in animal life, and the following species have all been noticed. *Fox, badger, otter, stoat, weasel, hedgehog, brown rat, water vole, long tailed field mouse, short tailed field vole, mole, hare and rabbit.* There is a fine herd of Fallow Deer in the park at Aldby. Bats are represented by the *noctule, pipistrelle, whiskered and long eared bat*; it is probable that other species occur.

Birds.—The district is particularly rich in bird life, and the Ornithologists of the Union should spend a delightful time observing the many interesting species. Some old brick pits about half a mile from the village are the haunts of numerous coots and moorhens, and other breeding species are *little grebe, reed bunting, sedge warbler, pied and yellow wagtail, chiff-chaff, and willow wren.* In the neighbourhood of the village, beside the usual common species, the mill dam in the river Derwent is an attractive place to both *kingfisher* and *water ouzel*, and the *sandpiper* is occasionally seen.

The walk through the famous Buttercrambe Woods will amply repay the student of bird life. *Green and great spotted woodpeckers* are fairly common, the *wood warbler, nightjar, tree creeper, grasshopper warbler, blackcap, garden warbler, long tailed tit, golden crested wren, turtle dove,* etc., are amongst the birds that may possibly be seen. On the marshy ground near the keeper's house, the *mallard* and *teal* are to be found, and *redshank* and *snipe* occur. Three pairs of *woodcock* have been successful in rearing their young in the woods this year, and the writer had the pleasure of observing two of the nests. Feathered "vermin" are tolerated on the Aldby Park estate as far as possible, owing to Major Collins being interested in our avi-fauna both *sparrow hawks* and *kestrels* are about in limited numbers, and the *tawny owl, barn owl* and *long eared owl* are to be found. Other species include *jay, magpie, carrion crow, landrail, cuckoo, ringdove* and *stockdove.* Several of the rarer hawks and buzzards have been shot in the district, and I believe are to be seen in the collection at Aldby Park.

Reptiles and Amphibia.—The following occur:—*Viper, slow worm, toad, frog, great warty newt* and *smooth newt.*

Fish.—The River Derwent abounds with fish. There is an annual run of salmon, and they are often to be seen jumping the weir at Stamford Bridge. Some large bull trout are seen below the weir but are seldom caught, one killed by an otter and found by the writer would have weighed four or five pounds. Other species are *grayling, pike, chub, roach, perch, bream, dace, bleak, eel, lamprey, millers thumb, minnow, fifteen-spined stickleback.* The Skirpenbeck which enters the Derwent above Stamford Bridge is fairly well stocked with brown trout.

CONCHOLOGY.—Mr. W. Denison Roebuck, F.L.S., writes:—The Land and Freshwater Mollusca of this district have never, so far as is known, been investigated, so there is a good field of work open. As the place is on the boundary of the North and East Ridings, care should be taken to keep the records separate. The Riding boundary is the River Derwent above Stamford Bridge, and below it the main road to York.

ENTOMOLOGY.—The Entomological Section will be officially represented by Mr. Wm. Hewett who writes:—Buttercrambe Woods and the adjoining district is a first-class collecting ground for the Entomologist, and the following are a few of the species that may be looked for on the date of the excursion:—*Argynnis paphia*, *Argc galatea* (used to occur in abundance, and a sharp look out should be kept for it), *Thecla quercus*, *Polyommatus phlæas*, *Zygæna loniceræ* and *filipendulæ*, *Callimorpha jacobeæ*, *Chelonia caja*, *Odonestis potatoria*, *Metrocampa margaritata*, *Boarmia repandata*, *Geometra papilionaria*, *Triphaena fimbria*, *Plusia iota* and *v. aureum*. The larvæ of *Acronycta alni* should be looked for on the upper sides of the leaves of the alder, oak and birch.

Mr. G. T. Porritt, F.L.S., F.E.S., states that a fine dark form of *Ennomos fuscantaria* occurs at Stamford Bridge, the larvæ of which ought to be found on ash at the time of the excursion.

Coleoptera.—Mr. E. G. Bayford, F.E.S., writes:—Apparently there are no records of Coleoptera from the precise area intended to be investigated, and previous excursions to the neighbourhood of Pocklington in 1893 and 1905, were singularly unproductive. Perhaps the best species recorded were from Allerthorpe Common, about eight miles as the crow flies from Stamford Bridge, viz., *Geotrupes typhœus* and *Coccinella hieroglyphica*.

ARACHNIDA.—The Arachnida Committee will be officially represented. Mr. W. Falconer writes:—The district offers much favourable ground for collecting, but as yet its spider population has not been investigated, and there are no records for any place nearer than York, Pocklington or Riccall Common.

PROGRAMME OF MEETINGS:—

3-45 p.m., Meat Tea, 1/6 each.
4-30 p.m., Sectional Meetings.
4-35 p.m., General Meeting.
} At the Bay Horse Inn, Stamford Bridge.

The Chair will be taken by the President of the Union.

Trains.—To York, 5-13, 8-53 p.m. To Hull, 5-22, 8-27 p.m.

NOTICES.

The next Excursion of the Union will be to Great Ayton (August Bank Holiday Week-end) August 2nd to 4th.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before July 17th, to W. E. L. Wattam, 30 Towngate, Newsome, Huddersfield.

Circular 247.

Yorkshire Naturalists' Union.

THE 247TH MEETING

WILL BE HELD AT

GREAT AYTON

From SATURDAY, August 2nd, to MONDAY, August 4th, 1913.

RAILWAY ARRANGEMENTS.—Through return tickets at single fare and a third will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland & N.E. Railways, which have booking arrangements for Great Ayton, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination the reduced fares being available for each stage of the journey.

Tickets taken on Friday or Saturday, August 1st or 2nd, will be available for returning any day up to and including Tuesday, August 5th, 1913.

The N.E. Rly. Co., issue cheap week-end tickets from all their stations, at a single fare for the double journey. Minimum—1st class fares 4/-; and 3rd class 2/6.

N.B.—The Railway Companies will only grant these reduced fares to Members and Associates surrendering at the time of booking a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it.

BOOKS AND MAPS.—The district for investigation is included in Sheet 33 One-inch Ordnance Map (also published geologically coloured). The six-inch sheets are 17, 28, 29 and 30. Reference may also be made to Baker's "North Yorkshire"; "The Moorlands of North-Eastern Yorkshire," by Frank Elgee, F.G.S.; "The Fungus Flora of Yorkshire," Massee & Crossland, (Trans. Y.N.U., Parts 28 and 32); "The Birds of Yorkshire," by T. H. Nelson, M.B.O.U.; "List of Yorkshire Lepidoptera," by G. T. Porritt, F.L.S., F.E.S., and Y.N.U. Circular No. 86, (July 1890).

HEADQUARTERS.—Buck Hotel, Great Ayton.

Accommodation.—This is very limited at all times and especially so in the holiday season, so that many members will have to sleep out. The Divisional Secretary has secured a large number of beds and members desiring to be present over the week-end should advise him with full particulars not later than the 26th July, so that he may make the best use of the accommodation available. Those who are willing to sleep double will oblige by saying so. The best arrangements possible will be made for their comfort and convenience, and the charges will in all cases be quite reasonable.

DISTRICT.—Mr. T. A. Lofthouse, writes, that the district to be visited is a very beautiful one and very varied, the walk through Kildale woods with the River Leven running along one side cutting a deep ravine in places, with a beautiful waterfall, and fine vistas, is one of the finest pieces of woodland scenery in Yorkhire. At the Easby end of the woods on a commanding position is situate the remains of early earth-works which will probably be of interest to

Archæologists who will also find some objects of interest in Kildale Church. Very extensive Fir Woods clothe the upper slopes of the hills both on the Kildale and Lonsdale Slopes, and the views from the higher parts over the Cleveland Hills to the East, and the plain of York to the West, are fine and very extensive. Ample scope is afforded for the energies of the members of every section.

ROUTES.—Geologists. Leader, Mr. J. J. Burton, F.G.S.

It is expected that the Yorkshire Geological Society, whose Headquarters are to be at Saltburn, will join the geological members of the Y.N U.

Saturday will be spent chiefly in examining the Whin Dyke and the physical changes which it has produced in the accessible lias shales through which it has forced it way.

Several glacial features will be pointed out, and an examination of exposures in the lias and also in the estuarines, of the inferior oolite will be made so far as time will permit.

Monday will be devoted chiefly to an examination of Roseberry Topping, its ironstone seams, the huge landslide which has taken place, and the wonderful exposure of plant remains.

If desired an opportunity will be given any of the members to enter the Mine on previous notice being given to the Divisional Secretary, to enable him to make the necessary arrangements.

Botanists and other Sections. Leader, Mr. T. A. Lofthouse, A.R.I.B.A., F.E.S.

On **Saturday,** on the arrival of the train due at Great Ayton at 11-11 a.m., the party will visit the Airyholme Woods and Quarries a little distance from Ayton Station, and work the ground in this neighbourhood until the arrival of the train due at 2-34 from Middlesbrough. After which they will proceed to Gribdalegate, into Lonsdale, and Lonsdale Woods to Kildale, about 3 miles. Trains leave Kildale for Ayton, Stokesley and Middlesbrough at 6-40 and 8-56.

On **Monday,** meet at Ayton Station at 9 o'clock on arrival of train from Stokesley and Battersby, etc. Walk from Ayton to Kildale by upper path (3 miles), joining main party at Kildale at 11-30, and then proceed through Kildale Woods, Easby Woods to Easby and Great Ayton Station, distance 4 to 5 miles. An alternative route could be taken from Kildale Woods across the moors by Captain Cook's Monument to Great Ayton, by those who prefer to be on high ground.

PERMISSION to visit their estates and properties has been obtained from the owners of Airyholme Estate, the Roseberry and Cockshaw Mines, R. B. Turton, Esq., J. J. Emerson, Esq., and J. B. Hodgkin, Esq., and the Gribdale Mining Co., Ltd.,

GEOLOGY.—The Geological Section will be officially represented by one of its Secretaries, Mr. John Holmes, and Mr. J. J. Burton, F.G.S.

Mr. Burton, writes:—Great Ayton lies in the drift covered area of the Cleveland plain, just below the lias escarpment of the moors of North Cleveland. The escarpment is generally capped by the inferior oolite, and exposures of both the lias and the oolite are numerous and easily accessible

Dominating the village is Cliff Rigg; a hog-back of whinstone which has resisted denudation much more than the softer lias shales through which it rises, causing a very striking feature in the landscape.

The Dyke after pursuing a long course from the W., swells out to a great thickness at Great Ayton and then thins away until it dies out near Robin Hood's Bay. Dr. J. J. Harris Teall, gives it as an augite-andesite of Tertiary age with a sp. g. of 2.77 and an analysis of 57% to 59% of Silica. The rocks on each side of the dyke have had their planes of cleavage considerably altered for some distance.

Another dominating feature of the district is Roseberry Topping— a conical hill over 1,000 feet in height, formed in the lias but having a cap of hard oolitic sandstone which has preserved it from denudation. This hill has recently split across the top and one steep side, which appears to have been in a state of unstable equilibrium, has fallen away, with some extraordinary results. This splitting of the top has exposed to view a very remarkable plantbed previously known to exist but difficult to locate. The surrounding escarpments also contain plant remains in vast quantities.

For details of the Geology, see the "Geological Survey Memoir on North Cleveland" by Geo. Barrow, F.G.S.

For the Whin Dyke, see Dr. J. J. Harris Teall's "Petrology"; also the "Quarterly Journal Geological Society," vol. xl., p. 224.

For the Jurassic Plantbeds, see "The Naturalist," of May, 1913.

BOTANY.—The Botanical Section will be officially represented by Dr. T. W. Woodhead, F.L.S.

Flowering Plants.—The district will be found to be an interesting one to the botanist. The following are amongst the plants that will be met with:—*Drosera rotundifolia, Campanula latifolia, Pedicularis palustris, P. sylvatica, Agrimonia eupatoria, Scrophularia nodosa, Mimulus luteus, Euphrasia officinalis, Scutellaria galericulata, Trientalis europæa, and Briza media.*

Mr. Frank Elgee, F.G.S., writes:—Heather moorland is well developed on Great Ayton and Kildale Moors. Easby Moor is a good example of the Mat Grass and Heather Moor, a type that often prevails at the moor edge in Cleveland. Lonsdale is a characteristic moorland valley with great *Juncus* swamps on its floors The hill slopes are largely clothed with Bracken and Grass, and sometimes Gorse is abundant as on Cockshaw Hill.

Mosses and Hepatics.—Mr. W. Ingham, B.A., who will attend the meeting writes:—The following Bryophytes may be found close by Great Ayton.

Mosses.—*Polytrichum alpinum, P. formosum, Pleuridium axillare, Swartzia montana, Fissidens exilis, F. incurvus, Pottia lanceolata, Weisia crispa, Hedwigia albicans, Tetraplodon mnioides,* and *Aulacomnium androgynum.* Mr. Mudd found the very rare moss, *Oreas Mielichhoferi var. elongata* on dripping liassic rocks above Ingleby Greenhow, and it would be very interesting to find this moss near Great Ayton. Its only other British habitat is on iron-bearing rocks above Loch Kander, S. Aberdeen, where it was refound in July, 1912.

Sphagna.—These are to be sought for chiefly on Ayton Moor where grows the rare *S. obesum.* On Roseberry Topping grow *S. cymbifolium, var. glaucescens, S. papillosum var. normale, S. turfaceum,* and *S. rufescens.* These sphagna and others probably occur nearer Great Ayton.

Hepatics.—*Alicularia scalaris, Plagiochila asplenioides, Lophocolea bidentata, Lophozia Floerkii, L. incisa, Lepidozia setacea, Blepharozia ciliaris,* and *Radula complanata.*

Note.—The Basaltic Dyke close by should prove good ground for rare mosses and hepatics.

Fungi.—The Yorkshire Mycological Committee will be officially represented by its Secretary, Mr. Charles Crossland, and other members.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will probably be officially represented.

Mammals.—Mr. T. A. Lofthouse, writes:—The Badger occurs in the district, and the Otter in the River Leven. Others which have been noted are Squirrel, Stoat, Weasel, Hedgehog, Water Vole, Field Vole, Short-tailed Field Mouse, Shrew.

Birds.—The district is one particularly suitable for bird life, and the following interesting specimens have been noted, viz.:—Green and Spotted Woodpeckers, Jay, Pied Fly Catcher, Tree Creeper, Blackcap, Long-tailed Tit, Gold-crested Wren, Stock Dove, Woodcock, Snipe, Hawfinch, Night-jar, Kingfisher, Sandpiper and Ring Ouzel. The common Buzzard is occasionally noticed. On the moors the Curlew, Golden Plover, and occasionally the Merlin breed. The Heron used to breed in the district but is only a visitor at the present time.

Reptiles.—The Viper, Ringed Snake and Slowworm are not common.

CONCHOLOGY.—This Section will probably be officially represented. Mr. T. A Lofthouse, writes:—The district is a rich one for Land Mollusca, such specimens as *Acme lineata, Pupa anglica, Helix fusca, aculeata, lamellata,* and some of the *Vertigoes* having been taken.

ENTOMOLOGY.—The Entomological Section will be officially represented by Mr. G. T. Porritt, F.L.S., F.E.S.

Lepidoptera.—Mr. T. A. Lofthouse, writes:—Many interesting species of Lepidoptera occur in the district to be visited, and a specimen of the Brimstone Butterfly, *G. Rhamni,* was taken in the district as recently as 1911. Among the Macros occuring in the district are *E. tithonus T. rubi, N. plantaginis* and *var. Hospita, N. Russula. C. furcula, N. dictœoides, A. ligustri, Noctu depuncta, N. stigmatica, N. dahlii, O. suspecta, C. Haworthii, S. anomala, C. solidaginis, C. xerampelina, H. glauca, T. populeti, T. piniperda, V. cambrica, A. Blomeri, L. filigrammaria* and *autumnaria, L. olivata,* and *cœsiata, Eup. castigata, valerianata, fraxinata, pulchellata,*

exiguata, etc. Many interesting *tiniæ* occur, it being the only recorded Yorks. locality for *Retinia turiorana*, *Pd. rufimitrana*, *Pd. rubiginosana*, *Grapholitha cineruna*, *Tinea weaverella*, *Argyresthia atmoriella*, *Argyresthia conjugella var. Ænariella*, *Elachista monticola*, and other interesting micros that occur are *Coccyx nanana*, *Coccyx tœdella*, *Sciaphila sinuana*, *S. nubilana*, *M. Schulziana*, *Stigmonota coniferana*, *dorsana* and *internana*, *Clepsis rusticana*, *Tinea corticella*, *Cerostoma sequella*, *vitella*, and many other species of interest.

Coleoptera.—The Coleoptera Committee will be officially represented by Mr. M. L. Thompson, F.E.S., who writes:—In the Circular for the Castleton Meeting (No. 230) two years ago, I mentioned some of the more uncommon beetles to be found on the Castleton and Danby Moors. As the routes on the present occasion are more in the direction of Kildale, some very good ground will be investigated both on the moors and in the Fir woods, as well as on the marshy spots which occur in the hollows. The following interesting beetles have been met with in this neighbourhood during recent years, viz.:—*Amara lunicollis*, *Anchomenus gracilis*, *Hydroporus umbrosus*, *H. longutus* (*celatus*), *Ilybius œnescens*, *Rhantus bistriatus*, *Helophorus arvernicus*, *Gymnusa variegata*, *Hygronoma dimidiata*, *Tachyporus transversalis*, *Megacronus cingulatus*, *Quedius fumatus*, *Q. umbrinus*, *Philonthus nigrita*, *Olophrum fuscum*, *Subcoccinella 24-punctata*, *Aphodius constans*, *Ancistronycha abdominalis*, *Telephorus paludosus*, *Dryophilus pusillus*, *Cassida flaveola*, and *Hypera pollux*.

Mr. E. G. Bayford, F.E.S., writes—Amongst the species which have been recorded, the following may be mentioned:—*Notiophilus aquaticus*, *Olisthopus rotundatus*, *Quedius molochinus*, *Stenus impressus*, *Oxytelus tetracarinatus*, *Mysia oblongoguttata*, *Anaitis ocellata*, *Lema lichenis*, *Apion dichroum*, *Strophosomus coryli*. The interest that is now being taken in the variation of species is sufficient reason for pointing out that a visit to this district affords a splendid opportunity for studying the mountainous forms of even the commonest species.

ARACHNIDA.—The Arachnida Committee will probably be officially represented.

Mr. W. Falconer writes:—The district disputes with Spurn the honour of being the best in the county for rare and unexpected spiders. It is the only European locality for *Hypselistes florens Camb*, a North American species; the only British locality for *Notioscopus sarcinatus Cambr.*, a Central European Spider; the only Yorkshire locality for *Hypselistes jacksonii Camb.*, *Troxochrus ignobilis Camb.*, and *Xysticus sabulosus Hahn*. Other scarce spiders which elsewhere in the county occur in the S W. or more rarely, if at all, in the West are also to be found, *e.g.*, *Onesinda minutissima Camb*, *Hilaira uncata Camb*, *Centromerus arcanus* and *prudens Camb*, *Typhochrestus dorsuosus Camb*, *Lophocarenum mengii Sim*, *Caledonia evansii Camb*, *Cornicularia vigilax Bl*, etc. Other uncommon Yorkshire spiders taken in the district are *Agroeca brunnea Bl*, *Argyroneta aquatica Latr* (water spider), *Hahnia nava Bl*, *Hilaira excisa Camb*, *Enidia cornuta Bl.*, *Coryphœus distinctus F.O. P. Cb.*, *Diplocephalus beckii Camb.*, *Xysticus erraticus Bl.*, *Oxyptila atomaria Panz.*, *Cornicularia kochii Camb.*, etc. Some of the above, however, are only to be met with on the bold eminence known as Eston Nab, and have, therefore, a restricted range.

MEETING on Monday, August 4th.—For general convenience this will be held in the Middlesbro' Station Dining Rooms. All members will leave Great Ayton Station at 5-14 p.m., arriving in Middlesbro' at 5-33 p.m., when Tea will be served immediately. After tea the various meetings will be held. The charge for the Meat Tea will be 1/6 each.

The Chair will be taken by the President of the Union.

Trains.—From Middlesborough to Great Ayton, 7-30 and 10-50 a.m.; 2-13, 4-32, 5-10, 6-10, and 8-32 p.m. From Middlesborough to York, Leeds, Huddersfield, Sheffield, 7-28 p.m. To Bridlington by the coast at 5-16 p.m from Hutton Gate (a pleasant 2½ miles walk from Roseberry Topping) or at 5-12 p.m. from Pinchingthorpe by driving from Great Ayton.

NOTICES.

MARINE BIOLOGICAL COMMITTEE.—The Annual Meeting will take place at Filey, August 29th to September 2nd, 1913.

MYCOLOGICAL COMMITTEE.—The Annual Meeting will take place at Sandsend for Mulgrave Woods, September 20th to 25th, 1913.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before August 15th, to W. E. L. Wattam, 30 Towngate, Newsome, Huddersfield.

Circular 248.

Yorkshire Naturalists' Union.

President:
HAROLD WAGER, F.R.S., F.L.S.

Ex-Presidents:
John Gilbert Baker, F.R.S., F.L.S., Kew.
Rt. Hon. Lord Walsingham, M.A., F.R.S., Thetford, Norfolk.
Sir Ralph Payne Gallwey, Bart, M.B.O.U., Thirkleby Park.
Henry Eeles Dresser, F.L.S., F.Z.S., London.
R. H. Tiddeman, M.A., F.G.S., Oxford.
Robert Braithwaite, M.D., F.L.S., London.
Prof. W. Boyd Dawkins, M.A., F.R.S., Manchester.
William West, F.L.S., Bradford.
George T. Porritt, F.L.S., F.E.S., Huddersfield.
Prof. Percy F. Kendall, M.Sc., F.G.S., Leeds.
W. Denison Roebuck, F.L.S., Leeds.
A. H. Pawson, J.P., F.L.S., F.G.S., London.
G. W. Lamplugh, F.R.S., F.G.S., London.
W. Eagle Clarke, F.R.S.E., Edinburgh.
Charles Crossland, Halifax.
Dr. Wheelton Hind, M.D., B.Sc., F.G.S., Stoke-on-Trent.
W. H. St. Quintin, J.P., D.L., M.B.O.U., Scampston, York.
Prof. A. C. Seward, M.A., F.R.S., Cambridge.
Alfred Harker, M.A., F.R.S., Cambridge.
John W. Taylor, Leeds.

Hon. Secretaries:
T. W. WOODHEAD, Ph.D., F.L.S., Technical College, Huddersfield.
W. E. L. WATTAM, 30 Towngate, Newsome, Huddersfield.

Divisional Secretary:
J. J. BURTON, F.G.S., Rosecroft, Nunthorpe, R.S.O. Yorks.

Hon. Treasurer:
EDWIN HAWKESWORTH, Sunny Side, Cross Gates, Leeds.

THE 248TH MEETING

WILL BE HELD AT

SANDSEND,

(Near Whitby),

FOR

Mycological Research in Mulgrave Woods

AND ADJOINING DISTRICT,

From Saturday, Sept. 20th, to Sept. 25th, 1913.

Chairman of Mycological Committee:
GEORGE MASSEE, V.M.H., etc., of the Herbarium, Royal Botanic Gardens, Kew.

Hon. Secretary, Mycological Committee:
CHAS. CROSSLAND, 4 Coleridge Street, Halifax.

RAILWAY ARRANGEMENTS—Through return tickets at the single fare and a third will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N. W., Midland & N. E. Railways, which have booking arrangements for SANDSEND, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Tickets will be available for the outward journey from the 19th September to 25th Sept., inclusive, and for return up to, and including the 26th September. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination the reduced fare being available for each stage of the journey.

The N.E. Rly. Co., issue week-end tickets from all their stations on Friday, Saturday, to Sandsend, at a single fare for the double journey, minimum 1st class 4/-, 3rd class 2/6. The return journey can be made with these tickets on Monday, or Tuesday.

N.B.—The Railway Companies will only grant these reduced fares to Members and Associates surrendering at the time of booking a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it.

PERMISSION to pay a sixth extension visit to the woodlands on the estates connected with Mulgrave Castle has been granted by the Rev. the Marquis of Normanby. Last year it was again further considered advisable to continue the investigation for another season and then summarise the Mycological work done in this district.

HEADQUARTERS are at Mrs. T. Kidd's, Normanby House, Sandsend. Members must write direct to Mrs. Kidd to secure accommodation. The Work Rooms are at the School close by, Monday, Tuesday, and Wednesday.

ROUTES will be set out each morning.

PAPERS will be read, and Talks given as follow:—

Saturday Evening—

"The Structure of Fungi" by Mr. HAROLD WAGER, F.R.S.

"Notes on the Genus Mycena," by Miss IVY MASSEE.

"The Genus Hygrophorus," by Mr. A. CLARKE.

Monday Evening—

"Outlines of the Evolution of the Basidiomycetes," illustrated by the Lantern, by Mr. G. MASSEE, V.M.H.

"Exhibition of Lantern Slides of Fungi," by Mr. A. E. PECK, F.L.S.

Tuesday Evening—

"The Micro-chemical Selection of Aldehydes in Fungal Tissues," by Mr. HAROLD WAGER, F.R.S.

"Notes on Fungus Habitats," by THOS. GIBBS.

Wednesday Evening—

Results of all previous investigations, by the Secretary.

Business Meeting, 8-30 p.m.

Miss Massee, and Messrs. Massee, Clarke, Crossland, and Gibbs, will have a series of coloured drawings for inspection.

Mycologists are expected to bring their Books, Microscopes, etc.

Yorkshire Marine Biology Committee.

Chairman - - - - J. Irving, M.D., Scarborough.
Convener - - Rev. F. H. Woods, B.D., Bainton, Driffield.

A MEETING

of the Marine Biology Committee will be held at

FILEY,

From Friday, Aug. 29th, to Tuesday, Sept. 2nd, 1913.

Headquarters—Vernon Boarding House.

RAILWAY ARRANGEMENTS—Through return tickets at the single fare and a third will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N. W., Midland & N. E. Railways, which have booking arrangements for Filey, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. The tickets will be available for the outward journey from Aug. 28th to Sept. 2nd, and will be available for returning any day up to and including Wednesday, Sept. 3rd, 1913. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

The N. E. Rly. Co. issue week-end tickets from all their stations on Friday, Saturday, and up to mid-day on Sunday to Filey at a single fare for the double journey, minimum 1st class 4/-, 3rd class 2/6. The return journey can be made with these tickets on Sunday, Monday, and Tuesday.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it.

In the daytime, especially the mornings when the tide is low, excursions will be made in search of forms of marine life, and each evening there will be discussions on the specimens collected. There will be lectures, probably, by Dr. Irving, and others.

Accommodation.—Suitable accommodation can be secured at the Vernon Boarding House, opposite St. John's Church, at from 4/6 to 6/6 per day according to rooms, but notice should be sent to Mr. Woods to reach him **not later than Thursday, August 28th,** stating the number of days for which accommodation is required.

Filey Bay is an interesting centre for marine life, many of the rarer species being found on the Brigg and the adjoining Spittal Rocks. Among many others may be mentioned the great borer *Zirphoea crispata*, of which there is a large colony. *Trochus pelicinus*, *Chiton ruber*, which are found alive on the Brigg. *Psammotia feroensis* and *Cochlodesma* are sometimes washed up alive, and among the shell sand are to be found a very large number of species, including among the rarer sorts *Limacina retroversa* and *Cæcum glabrum*. In fact the mollusc fauna of the seaweed feeding species and the sand species are here combined as probably nowhere else on the Yorkshire Coast, and the place is sure to yield interesting results to a patient and thorough investigation.

The Committee will give a hearty welcome to those interested in any branch of Marine Biology.

MEMBERS are requested to note the following Meetings of the Union:

ANNUAL MEETING, at York, on Saturday, 13th December.

SECTIONAL MEETINGS.

VERTEBRATE ZOOLOGY.—Saturdays, Nov. 15th, 1913, and February 21st, 1914, at the Leeds Institute.

BOTANY, BRYOLOGICAL SECTION.—Saturday, 1st Nov., Doncaster.

ANNUAL MEETING, BOTANICAL SECTION, at Huddersfield, Saturday, 18th October.

CONCHOLOGICAL SECTION, ANNUAL MEETING, at Leeds University, Saturday, 11th October, 1913.

ENTOMOLOGICAL SECTION, ANNUAL MEETING, at Leeds, Saturday, 25th October, 1913.

These dates, etc., are subject to such alterations as may be necessitated by local considerations.

Yorkshire Naturalists' Union.

President:
HAROLD WAGER, F.R.S., F.L.S.

President-Elect:
THOMAS SHEPPARD, F.G.S., F.S.A. (Scot.).

Ex-Presidents:

John Gilbert Baker, F.R.S., F.L.S., Kew.
Rt. Hon. Lord Walsingham, M.A., F.R.S., Thetford, Norfolk.
Sir Ralph Payne Gallwey, Bart, M.B.O.U., Thirkleby Park.
Henry Eeles Dresser, F.L.S., F.Z.S., London.
R. H. Tiddeman, M.A., F.G.S., Oxford.
Robert Braithwaite, M.D., F.L.S., London.
Prof. W. Boyd Dawkins, M.A., F.R.S., Manchester.
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Prof. Percy F. Kendall, M.Sc., F.G.S., Leeds.
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Charles Crossland, Halifax.
Dr. Wheelton Hind, M.D., B.Sc., F.G.S., Stoke-on-Trent.
W. H. St. Quintin, J.P., D.L., M.B.O.U., Scampston, York.
Prof. A. C. Seward, M.A., F.R.S., Cambridge.
Alfred Harker, M.A., F.R.S., Cambridge.
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Hon. Secretaries:
T. W. WOODHEAD, Ph.D., F.L.S., Technical College, Huddersfield.
W. E. L. WATTAM, 30 Towngate, Newsome, Huddersfield.

Divisional Secretary:
J. W. STATHER, F.G.S., Brookside, Newland Park, Hull.

Local Secretary:
W. INGHAM, B.A., 52 Haxby Road, York.

Hon. Treasurer:
EDWIN HAWKESWORTH, Sunny Side, Cross Gates, Leeds.

THE 249TH MEETING
AND
52nd ANNUAL MEETING
WILL BE HELD AT

YORK

Preceded by an EXCURSION to the Grounds of the British Botanical Association, or Askham Bog,

On SATURDAY, DEC. 13th, 1913.

RAILWAY ARRANGEMENTS—Through return tickets at the single fare and a third will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N. W., Midland & N. E. Railways, which have booking arrangements

for York, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Tickets will be available for the outward journey from the 12th to 13th December, inclusive, and for return up to, and including the 15th December. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fare being available for each stage of the journey.

The N.E. Rly. Co., issue week-end tickets from all their stations on Friday, and Saturday, to York, at a single fare for the double journey, minimum 1st class 4/-, 3rd class 2/6. The return journey can be made with these tickets on Monday or Tuesday.

N.B.—The Railway Companies will only grant these reduced fares to Members and Associates surrendering at the time of booking a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it.

PROGRAMME.

Excursion.

At 11-30 a.m. prompt, start by tram from the entrance gates of the Museum for Holgate, where the members will be conducted round the premises of the British Botanical Association ; *or* visit Askham Bog if preferred.

12-30 to 2-15 p.m. Three Course Dinner.

at the Davy Hall, Davygate. 1/6 each.

The 52nd Annual Meeting

will be held in the Tempest Anderson Hall at the Museum.

2-30 p.m. The Sectional Meetings

(which all members and associates are entitled to attend), will be held for the Election of Officers of Sections, and to receive the Annual Reports from their Secretaries.

3 p.m. The General Committee

(each member of which receives a special summons with this circular), will meet to consider the Annual Report, Elect Officers, and arrange the Excursion Programme for 1914.

5 p.m. A Meat Tea

in the Davy Hall, Davygate, 1/3 each.

6-30 p.m. The General Meeting

of members and associates will be held. The Chair will be taken by the President of the Union, supported by prominent members. After the reading of the Annual Report and the announcement of the Excursion Programme for 1914,

The Presidential Address

will be delivered by Mr. Harold Wager, F.R.S., F.L.S., (Leeds). Subject: "The Movements of Micro-Organisms in Response to External Forces (with lantern illustrations). During the delivery of the address, the chair will be occupied by The Right Honourable the Lord Mayor of York (Councillor Rhodes Brown). After the delivery of the Presidential Address, the Yorkshire Philosophical Society invites the members and associates of the Union to

A Conversazione

in the Museum. Evening Dress optional. Refreshments will be provided by the Philosophical Society.

Exhibits.

Lantern Slides, by Mr. Oxley Grabham, M.A., Mr. S. H. Smith, and Mr. C. A. Cheetham (in colour). By Mr. W. Ingham, B.A., Marine Algae, Lichens, Hepatics, Sphagna, true Mosses, rare Ferns, and Club Mosses. Rare Birds and Waders, by Mr. C. Proctor and Mr. S. H. Smith.

Mr. S. H. Smith will be pleased to show Birds of Yorkshire and Derwent Valley, at 20 Park Crescent, York.

The Museum.

The Museum of the Yorkshire Philosophical Society contains one of the best collections of Roman remains in the kingdom. These are for the most part housed in the hospitium, a separate building in the grounds, which was originally the old guest house of St. Mary's Abbey. In the main building there is an excellent geological collection, containing not only a first-rate series of Yorkshire fossils, but also many type specimens in the general collection.

There is also a good collection of British Birds, including many rarities obtained in the county, together with two specimens of the now extinct Great Auk.

The Allis collection of Lepidoptera is very complete, and contains some species now extinct in this county. The Hey collection of British Coleoptera is also very good. In the Grabham collection of British Mammals is a very fine series of varieties of the Mole. There is an excellent osteological collection, and many most valuable remains of prehistoric man, consisting of flints, bronzes, iron, cinerary urns, etc., many of them having been dug out from the graves of these ancient people scattered throughout the county. A good series of Danish remains is also exhibited, many of these having been dug up in York.

A good collection of old Pottery and Glass is in the Society's possession, and is exhibited in the gallery of the Central Hall.

There is also an interesting Ethnological Series.

Return Trains

leave York for Leeds, Huddersfield, Bradford, and Ilkley, 8-8 and 9-35 p.m. Hull, 8-5 and 9-50 p.m. Scarborough, 8-10 and 10-40 p.m. Darlington and Middlesborough, 8-0 and 9-20 p.m. Sheffield,

Cards of Membership.

The production of this is absolutely necessary for the obtaining of railway tickets at reduced rates, and for admission to the various meetings.

Members who have lost or mislaid their card may obtain another on application to the Secretaries.

Associates may obtain their card through the Secretary of their own local Society.

Election of Additional Members of General Committee.

Voting papers are not sent out this year, but members may vote by post card, addressed to the Secretaries, The Technical College, Huddersfield, making their choice from the List of Members.

New Members.

A special effort is being made to get a good addition of members. Towards this the Hon. Secretaries would be glad to receive the nomination paper on the back hereof duly filled in. The Subscription is 10/6 per annum, and members receive *The Naturalist*, *Transactions*, etc., free. The new volume of *The Naturalist* commences on January 1st.

Yorkshire Naturalists' Union.

.....19

.....[*Signature and Titles*].

.....

.....[*Address*].
wishes to become a Member of the Yorkshire Naturalists' Union, and will subscribe HALF-A-GUINEA (10/6) per annum, until the end of the year in which written resignation is given.

.....
.....
[*Signature of Proposer and Seconder*].

Elected.....19 at.....

..... *Chairman's Signature.*

This form, when filled up and signed, should be sent to the Secretaries of the Union, accompanied by the amount of the first year's subscription.

The subscription of 10/6 entitles the members to receive the Union's monthly magazine, "The Naturalist," as well as the "Transactions."

Persons related to and resident in the family of a member are admitted as 5/- members, to enable them to attend excursions, but not receiving the publications.

Qualification for Life Membership:—A Donation of 7 Guineas.

Circular 250.

Yorkshire Naturalists' Union.

President:

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

Ex-Presidents:

John Gilbert Baker, F.R.S., F.L.S., Kew.
Rt. Hon. Lord Walsingham, M.A., F.R.S., Thetford, Norfolk.
Sir Ralph Payne Gallwey, Bart, M.B.O.U., Thirkleby Park.
Henry Eeles Dresser, F.L.S., F.Z.S., London.
R. H. Tiddeman, M.A., F.G.S., Oxford.
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Charles Crossland, Halifax.
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W. H. St. Quintin, J.P., D.L., M.B.O.U., Scampston, York.
Prof. A. C. Seward, M.A., F.R.S., Cambridge.
Alfred Harker, M.A., F.R.S., Cambridge.
John W. Taylor, Leeds.
Harold Wager, F.R.S., F.L.S., Leeds.

Divisional Secretary:

RILEY FORTUNE, F.Z.S., 1, Avenue Road, Harrogate.

Hon. Secretaries:

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W. E. L. WATTAM, 30 Towngate, Newsome, Huddersfield.

Hon. Treasurer:

EDWIN HAWKESWORTH, Sunny Side, Cross Gates, Leeds.

THE 250TH MEETING

WILL BE HELD AT

KNARESBOROUGH

On Easter Saturday, April 11th, to Easter Monday, April 13th, 1914.

RAILWAY ARRANGEMENTS—Through return tickets at single fare and a third will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N. W., Midland & N. E. Railways, which have booking arrangements for Knaresborough, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination the reduced fares being available for each stage of the journey.

Tickets taken on Friday or Saturday, April 10th or 11th, will be available for returning from either station any day up to and including Tuesday, April 14th, 1914. Tickets will be issued from N.E. Stations from Thursday, 9th April, to Monday, 13th April, available for return on Saturday, 11th April, to Tuesday, 14th April.

N.B.—The Railway Companies will only grant these reduced fares to Members and Associates surrendering at the time of booking a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it.

BOOKS AND MAPS.—The district for investigation is included in Sheets 154 and 155 Six-inch Ordnance Map, and Sheets 61 and 62 One-inch Ordnance Map (also to be obtained geologically coloured). The following works may also be consulted:—"Names of some Plants which grow in the neighbourhood of Knaresborough," by E. Hargrove (1832); "H. C. Watson's "Topographical Botany," Part I. (1873), Part II. (1874); H. Ibbotson's "The Ferns of York, including also Nidderdale" (1884); Calvert's "History of Knaresborough," which contains an old, but interesting list of plants; Davis and Lee's "West Yorkshire;" F. A. Lee's "Flora of the West Riding;" "Geographical Distribution of Vegetation in Yorkshire, Harrogate and Skipton District," by Smith and Rankin; "The Fungus Flora of Yorkshire," Massee and Crossland, Parts 28 and 32, Trans. Y.N.U. 1902 and 1905; Grainge's "History of Harrogate and Forest of Knaresborough;" H. Speight's "A Yorkshire Rhineland;" Thorpe's "Guide to Harrogate;" "The Birds of Yorkshire," by T. H. Nelson, M.B.O.U.; Y.N.U. Circulars, No. 80 (July, 1889) and No. 110 (July, 1894); Journal of Conch., Jan., 1889, pp. 18 to 31; "The Naturalist," 1912, p. 95.

HEADQUARTERS—High Bridge Private Hotel (Mrs. Blenkhorn), Riverside, Knaresborough, at which limited accommodation may be obtained. Terms from 5/6 per day. Accommodation can also be obtained at the hotels and in private apartments.

ROUTES—**Saturday**—Meet at Station at 10 a.m. and then proceed down the river to Plumpton Rocks.

Monday—Meet at Station at 9-45 a.m. and then proceed along both banks of the river to Nidd Bridge.

In order to assist late arrivals a notice will be put up at Headquarters indicating as far as possible the route intended to be traversed.

PERMISSION to visit their respective estates have kindly been granted by Lord Furness, Lord Harewood, E. C. Geddes, Esq. and C. E. Charlesworth, Esq.

GEOLOGY.—The Geological Section will be officially represented by its Secretaries, Messrs. John Holmes, Edwin Hawkesworth and C. Bradshaw, F.G.S.

Mr. Hawkesworth writes:—The district may not be so attractive to the majority of Geologists as some visited by the Union, but it presents many interesting features. There is the classic section by the river side, beneath the Castle at Knaresborough, showing so clearly the Magnesian Limestone resting on the Millstone Grit (third grit), the surface of which is undulating, and the base of the limestone containing many quartz pebbles, these, apart from the fact of the limestone resting on the Coal Measures further south, proving the unconformability of the two formations. The junction may be still better seen a little lower down the valley, especially looking from the opposite side, and a beautiful walk by the river may be continued to Grimbalds Crag, where there is a remnant of limestone capping the grit. The walk may be further continued to Plumpton, where the curiously weathered red grit of that name is well worth seeing. This grit was called New Red Sandstone by the older geologists, but it is now definitely ascribed to the Millstone Grit series, about the same horizon as the famous Brimham Rocks. The Lower Magnesian Limestone can be examined in the Town Lime Quarries,—it is quite unfossiliferous, but contains a large number of cavities, many of which are lined with beautiful crystals of dolomite. The Nidd, and its valley, suggest some problems of interest, and those present may discuss why the river should cut right through the Permian escarpment. The valley at Knaresborough is a U-shaped gorge, typical of glacial erosion, and the district affords other examples of the results of glacial action, such as stream diversion, lakes, and deserted channels, that of Cayton Gill, formerly an inlet channel, being worthy of special mention. Another excursion may be made up the valley, in the course of which, on the way to Nidd Bridge, the axis of the

anticlinal, running from near Skipton to Harrogate, the disturbance caused by which is considered to give rise to the wonderful mineral springs of the latter place, can be seen. Some extensive quarries in the Millstone Grit, near Ripley station, are worth a visit, and on the opposite side of the river is a small faulted-in patch of Magnesian Limestone, faulted against the Grit on its southern boundary, the river here running along the fault-line. This excursion conveniently might terminate at the Clint Quarries, near Hampsthwaite station, where good sections are exposed in the Cayton Gill beds, a marine phase in the Millstone Grit, in which fossils are abundant.

Geologists will need no reminding of the famous Dropping Well at Knaresborough.

BOTANY.—The Botanical Section will be officially represented by Dr. T. W. Woodhead, F.L.S.

Flowering Plants.—Mr. C. A. Cheetham writes:—Plants which will be in flower are the Green Hellibore, Yellow Star of Bethlehem, Wallflower, on the Castle walls, Spring Potentilla, Laurel-leaved Daphne, Toothwort, and probably Goldilocks, Greater Celandine, and the large flowered Bittercress (*C. amara*). The Spring Sedge will be also conspicuous and the Wood Stitchwort showing its early bloom. Amongst Plants which will be seen, but not flowering, The Pellitory of the Wall, Autumn Crocus, showing last year's capsules, Deadly Nightshade (*Atropa Belladona*), and very noticeable on the river banks the seedlings of Impatient Balsam, an escape from cultivation.

Mosses and Hepatics.—This Section will be officially represented by its President, Mr. W. Ingham, B.A., who writes:—The Knaresborough district is rich in these plants. The most interesting out of a long list are the following—*Barbula gracilis* in the grounds of the Castle, *Weisia calcarea* and *W. verticillata* by the river side, *Eurhynchium tentellum* on stones, *Plagiothecium depressum* on blocks of limestones, *Eurhynchium murale var. julaceum* by the river-side, *Barbula revoluta* and *B. lurida*, *Tortula rigida*, *Thuidium recognitum* and *T. hystricosum* on grassy hillocks.

Hepatics.—A prominent feature is the abundance of the Liverwort *Lunularia cruciata* (a typical greenhouse hepatic) on stones by the river. *Conocephalus conicus* is also abundant by the river. The rare and minute *Haplozia pumila* grows on the sloping bank rising from the river.

Fungi.—The Yorkshire Mycological Committee will probably be officially represented.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will be officially represented by Mr. Riley Fortune, F.Z.S., who writes:—

Mammals.—Most of the smaller mammals abound. Bats are abundant, but the season will be too early for them. A large colony of noctules always spend the winter in the Castle Walls. Water Shrews are particularly plentiful in Sykes Beck.

Birds.—The district is very rich in bird life. The season is, however, too early for most of the migrants. Some of the earlier arrivals may be seen, notably the Chiff Chaff, the numbers of which was one of the notable features at the last meeting of the Union in the district. The valley being warm and well sheltered affords distinct inducements for the early arrivals. There are many interesting species amongst the resident birds, of which the following are notable examples, all of which nest in the district:—Red-legged Partridge, Stock Dove, Little Grebe, Woodcock, Tufted Duck, Kestrel, Sparrow-Hawk, Long-eared, Tawny and Barn Owls, Kingfisher, Green, Great Spotted and Lesser Spotted Woodpeckers, Dipper, Long-tailed, Great, Coal and Marsh Tits, Gold-crest, Nuthatch, Creeper, Pied and Grey Wagtails, Hawfinch, Tree Sparrow, Lesser Redpoll, Goldfinch, Bullfinch, Magpie and Jay.

Reptiles and Amphibians.—The Adder is found, also the Common Lizard and Slow Worm. Great Crested and Smooth Newts, the Palmated Newt should be looked for.

Fishes.—The Nidd is prolific in fish life. Salmon ascend as far as Goldsboro' weir, and on one occasion reached the weir at Killinghall. Trout are plentiful, and "coarse fish," as they are known by the angler, abound.

CONCHOLOGY.—This Section will probably be officially represented. Mr. W. Denison Roebuck, F.L.S., writes:—The district being a magnesian limestone, is rich in Mollusca—particularly about Grimbald Crag. Amongst the species which have been found are *Azeca*, *Vertigo Pygmea*, *var. albina of Pupa cylindracea*, *Ena obscura* and *var. albina*, *Helicigona lapicida*, *Vallonia pulchella*, *Punctum pygmæum*, *Helicella itala*, *H. Caperata*, *H. virgata*, *H. arbustorum*, etc. The late Mr. W. Nelson used to investigate the Asp Ponds, where he used to find *Limnæa palustris* in very fine condition. Appleby Carr on the Scriven Estate, and the lake at Plumpton are worth investigating for freshwater species.

ENTOMOLOGY.—The Entomological Section will be officially represented by Mr. G. T. Porritt, F.L.S., F.E.S.

Coleoptera.—The Coleoptera Committee will be officially represented by Dr. W. J. Fordham, F.E.S., who writes:—It is rather too early to meet with most of the species which have been recorded from the district. If the weather is favourable the groups most likely to be met with are species of *Adephaga*, *Coccinellidæ*, *Nitidulidæ*, and possibly a few *Staphylinidæ* If any whin is met with a look out should be kept for *Phlœophthorus rhododactylus Marsh*, which is an early species. *Meloidæ* may be looked for on warm grassy banks, and it may certainly repay the Coleopterist to investigate mole's nests—in this habitat *Quedius talparum Dev.* should occur and possibly *Heterothops nigra Kr.*, *Hister marginatus Er.* which occurred in Yorkshire last year in a mole's nest should also be looked for.

ARACHNIDA.—The Arachnida Committee will be officially represented by Mr. W. Falconer, who writes:—A very extensive district around Knaresborough is practically unworked, less than a dozen common species being on record, but much ground favourable to spider life exists and diligent collecting cannot fail to produce excellent results.

PROGRAMME OF MEETINGS:—

4-30 p.m., Meat Tea, 1/9 each.
5-15 p.m., Sectional Meetings.
5-20 p.m., General Meeting.

} On Monday, April 13th, at the New Century Dining Rooms, adjoining Headquarters.

The Chair will be taken by the President of the Union.

Trains —From Knaresborough to York, 6-13 and 8-15 p.m. ; To Harrogate, Leeds, Bradford, 6-10, 6-22 and 6-48 p.m.

NOTICES.

The next Excursion of the Union will be to Filey, on Whit-Saturday, 30th May, to Whit-Monday, 1st June.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before April 20th, to W. E. L. Wattam, 30 Towngate, Newsome, Huddersfield.

The Leeds Naturalist Club, in whose sphere of operation this district is, would be glad to have the fullest possible detailed information as to anything taken, which may be sent to Mr. W. Denison Roebuck, F.L.S., as the Club will prize all such notes for its local records.

Circular 251.

Yorkshire Naturalists' Union.

President:
THOMAS SHEPPARD, F.G.S., F.S.A. (Scot.).
Divisional Secretary:
J. W. STATHER, F.G.S., Brookside, Newland Park, Hull.
Hon. Secretaries:
T. W. WOODHEAD, Ph.D., F.L.S., Technical College, Huddersfield.
W. E. L. WATTAM, 30 Towngate, Newsome, Huddersfield.
Hon. Treasurer:
EDWIN HAWKESWORTH, Sunny Side, Cross Gates, Leeds.

THE 251ST MEETING

WILL BE HELD AT

FILEY,

On Whit-Saturday, May 30th, to Whit-Monday, June 1st, 1914.

RAILWAY ARRANGEMENTS—Through return tickets at single fare and a third will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N. W., Midland & N. E. Railways, which have booking arrangements for Filey, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

Tickets taken on Friday or Saturday, May 29th or 30th, will be available for returning from either station any day up to and including Tuesday, June 2nd, 1914.

N.B.—The Railway Companies will only grant these reduced fares to Members and Associates surrendering at the time of booking a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it.

BOOKS AND MAPS.—The whole area is included in Sheets 95 S.W. and S.E. of the one-inch Ordnance Map, which may be obtained geologically coloured. Geological Survey of the Yorkshire Coast, by Young and Bird; The Geology of Yorkshire, Vol. 1 (the coast, 1829 and 1875), by Jno. Phillips; Geological Survey Memoirs (Rocks South of Scarborough, by C. Fox-Strangways, new edition); The Yorkshire Oolites (Pal. Soc'y Monographs), W. H. Hudleston; Geological Rambles in East Yorkshire, by T. Sheppard; Filey Bay and Brig, by C. Fox-Strangways; J. F. Robinson's "East Riding Flora" (1902); Dr. W. G Smith's Paper on "The Vegetation of Ponds at Filey," with figures, pp. 389—396; "The Naturalist," 1903; "The Fungus Flora of Yorkshire," Massee and Crossland, Parts 28 and 32, Trans. Y.N.U., 1902 and 1905; E. W. Wade's "Birds of Bempton Cliffs" (1903); T. H. Nelson's "The Birds of Yorkshire" (1907); Transactions of the Hull Scientific and Field Naturalists' Club; Y.N.U. Circulars, June 1883, No. 119 (Sept., 1895), No. 172 (May, 1903), and No. 248 (Sept., 1913); Reports of previous excursions of the Union to the district in "The Naturalist."

HEADQUARTERS—Mrs. Gardner, York House, The Crescent, Filey, has a limited accommodation and will allocate rooms in order of application, and will give addresses for those she cannot accommodate. Those who are able to share room (or single beds) should state so, and would get preference. Terms 5/6 a day, this includes breakfast, dinner and bed.

ROUTES—SATURDAY. Filey Bay. All parties meet at the foot, seaside end of the Ravine, at 10-30 a.m., and each section will then choose its own route. For those staying the week-end, a visit to the country inland will be arranged, probably by conveyance, for the following day.

The members will meet at Headquarters at 7-30 p.m., when short papers will be read as follows :—

1. Notes on Marine Zoology. Rev. F. H. Woods.
2. Early History of Filey. The President.
3. Notes on Geology of the District. Mr. J. W. Stather.
4. Some Problems of Shore Plants. Dr. T. W. Woodhead.

MONDAY. All parties meet outside Filey Station at 10-30 a.m. The Geologists will proceed to the foot of the Brig, then on cliffs to Gristhorpe Bay. Descend to beach, and walk round Yons Nab into Cayton Bay.

The Botanists and general body of Naturalists under the guidance of Mr. J. Fraser Robinson, will examine the cliffs and intersecting ravines to the south, in the direction of Hunmanby.

Late arrivals should follow the routes specified, and in order to assist a notice will be put up at Headquarters indicating as far as possible the route intended to be traversed.

GEOLOGY.—The Geological Section will be officially represented by one of its Secretaries, Mr. John Holmes, and Mr. J. W. Stather, (Secretary of the Glacial and Coast Erosion Committees).

Mr. J. W. Stather, writes:—The Geology of the Filey district is extremely varied and attractive. The town is situated on Glacial beds at least 100 feet thick, containing many boulders and pebbles from widely separated sources. On the coast, a few miles to the south, are the famous Bempton and Speeton cliffs, where an unparalleled series of Lower and Upper Cretaceous Rocks can be examined. North of the town, the Carr Naze and Brig are very fine sections of the Middle Oolite and of the Boulder Clays above them. The Brig is easily accessible along the shore, and some of the beds, which belong to the upper part of the

Section of Cliffs between Filey and Cayton Bay.

Lower Calcarious Grit, are very fossiliferous. On the north side of the Naze is a series of curious coves, locally called the "Doodles," showing the peculiar vagaries of marine denudation. Above the "Doodles" the upper layers of the Oolite have in many places been crushed and contorted by the North Sea ice, and glacial striæ are traceable on the ledges of rock at the base of the Boulder Clays. From Carr Naze, northwards, the Oolites gradually rise in the cliffs so that at Cunstan Nab, at the south end of Gristhorpe Bay, where the cliff is 250 feet high, the whole thickness of the Oxford Clay and Lower Calcarious Grit is exposed, surmounted by thick Boulder Clays. In Gristhorpe Bay itself is an almost complete section of the Lower and Middle Oolites, including the beds from the Lower Calcarious Grit to the Millepore bed, and at Yons Nab at the north end of the Bay occurs the celebrated Gristhorpe plant bed. North of Yons Nab is Cayton Bay, and the magnificent Red Cliff sections and Fault. On the beach under Red Cliff is the Cornbrash, which is usually accessible.

BOTANY.—The Botanical Section will be officially represented by one of its Secretaries, Mr. J. Fraser Robinson, and Dr. T. W. Woodhead.

Flowering Plants.—Mr. J. Fraser Robinson, Author of "The Flora of the East Riding of Yorkshire," writes:—Although much attention has been paid already to the flora of the Filey district by the Y N.U., yet it is not known that any very complete list of plants has been made, preserved or published. Such a list is a distinct desideratum which should be kept in mind, especially with regard to the maritime phanerogams as well as of the plants of the more inland localities. The cliff tops to the south of Filey, and the slipped boulder clay forming a kind of "undercliff," on which there is a series of freshwater pools and other wet places, form a very good field for botanical investigation. Several little ravines intersect the pathway along the cliffs above mentioned, and in these will be found quite a number of good things, probably most of them in flower at this season. These are *Geranium sanguineum*, *Rosa pimpinellifolia*, *Spiræa Filipendula*, *Eupatorium cannabinum*, *Serratula tinctoria* and *Stachys Betonica*, *Anagallis tenella*, scarcely yet in flower, perhaps, is common in many wet places of the "under-

cliff." *Menyanthes trifoliata* will be in flower in the pools above mentioned, and with it, a *Sparganium* (whether *simplex* or *minimum* it is desirable to know) will also be found. *Eriophorum latifolium* was in flower when the Y.N.U. last visited Filey on 1st of June.

Without wishing to add a tinge of mystery to the paragraph, the writer, and others, would be glad to know if, as is stated, it is true that *Gagea fascicularis* (*vel lutea*) has actually been found in the district, and whether it is in a North or East Riding habitat. A specimen voucher at the meeting would be welcomed, and Scarborough botanists who are in the know would be thanked.

Mosses and Hepatics.—W. Ingham, B.A., writes:—I found the following on the boulder clay cliffs, almost all in 1897:—

Mosses.—*Ditrichum flexicaule, Dicranella varia, Barbula tophacea* forma *luxurians* (very tall), and the type in fruit, *B. fallax, Trichostomum crispulum, Webera albicans, Bryum pallens, B. pseudo-triquetrum, B. capillare, Thuidium tamariscinum, Camptothecium lutescens, Brachythecium albicans, B, rutabulum, B. velutinum, B. purum* (robust form), *Eurhychium, prælongum, E. striatum, E. rusciforme, Amblystegium serpens, A. filicinum, Hypnum polyganum, H. stellatum, H. cupressiforme* vars. *resupinatum, filiforme*, and *tectorum*.

Hepatics.—*Aneura latifrons, A. pinguis var. denticulata*, and *Pellia Fabbroniana*.

In Primrose Valley—*Weisia viridula, Ulota phyllantha*, and the Hepatic *Frullania dilatata*.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will probably be officially represented

Mammals.—The following have been noted, Hare, Rabbit, Hedgehog, Stoat, Weasel, Fox, Water Vole, Mole, Long-tailed Field Mouse, Field Vole, Pipistrelle and Noctule Bats.

Birds.—Mr. Riley Fortune, writes:—Members will probably be most interested in the cliff-breeding birds, and as the visit is timed when the birds in the Bempton Cliffs are busy with family matters, a day spent with them will amply repay the visitor. In addition to the vast number of Guillemots, Razorbills, Puffins and Kittiwakes, the following may be looked for in the cliffs: Carrion Crow, Jackdaw, Rock Dove, Stock Dove, House Martin, Rock Pipit, Tree Sparrow, Kestrel, etc., and no doubt a glimpse will be obtained of the Peregrine Falcons nesting here. In the little ravines many small birds will be noted, and between Filey and Speeton, amongst the rough ground on the cliff tops, the Stonechat, Corn Bunting and Teal may be seen. To the north of Filey many Herring Gulls nest in the cliffs, and also a small colony of Cormorants, and I have once known a pair of Lesser Black-back Gulls nesting here. Herring Gulls may often be seen raiding the eggs at Bempton.

Reptiles.—There are records of the Toad, Frog, Great crested and Smooth Newts, Lizard and Slowworm.

CONCHOLOGY.—This Section will be officially represented by one of its Secretaries, Mr. J. A. Hargreaves.

Rev. F. H. Woods, B.D., writes:—Land and Freshwater Mollusca.—The cliff banks with patches of marsh abound with *Succinea elegans*. There is also a considerable quantity of *Clausilia rugosa* and *Pupa* on the drier parts. *Helix arbustorum* is very abundant on the grassy slopes of the chalk cliffs beyond Speeton. *Bulimus obscurus* occurs in the Primrose Valley. Mr. J. A. Hargreaves adds:—South of Filey, *Vertigo antivertigo* and *V. pygmaea* occur. In the ditches on the Carrs inland are both *Valvata*, most of the *Planorbes*, including *P. fontanus* and several *Limnaeas, L. palustris* being particularly abundant. The River Hertford yields *Anodonta* with several varieties, and *U. pictorum* with its var. *curvirostris*.

Marine Mollusca—There is a fairly rich fauna of Marine Mollusca in and about the Brig and Spittal Rocks, but the neap tides will not be favourable to shore work. A large variety of microscopic shells are to be found in the debris washed up near the neck of the Brig. Mr. Hargreaves adds:—Near the Brig should be found *Mya arenaria, Cultellus pellucidus, Tellimya ferruginosa, G. erroensis, E. helicina, Z. crispata*, and *Sepiola scandica*.

MARINE ZOOLOGY—The Marine Biology Committee will be officially represented by its President, Mr. J. Irving, M.D . and its Secretary, Rev. F. H. Woods, B.D. Dr. Irving writes:—The neap tides will be against the work of the Marine Biologists. In the pools, and under boulders near the Brig end, a good deal may be accomplished. The Scarlet-fringed Anemone is common at Filey, and the Sea-hare (*Aplysia*) should be found in the shallow pools, together with their brown egg-coils attached to brown weeds. Zoophytes, Sponges, Worms and Nudibranchs will be obtainable at low water.

ENTOMOLOGY.—The Entomological Section will be officially represented by its President, Mr. E. O. Croft, M.D., and Mr. G. T. Porritt. Mr. Porritt writes:—Larvæ of *Toxocampa pasticinum* ought to be found about the patches of *Vicia sylvatica* on the cliffs, as well as an abundance of larvæ of *Zygæna trifolii* on *Lotus corniculatus*.

Coleoptera.—The Coleoptera Committee will be officially represented by its Secretary, Dr. W. J Fordham, and Mr. T. Stainforth, B.A. Dr. Fordham writes:—The list of captures made on a previous visit May 30—June 1, 1903 (See Nat. 1903, pp. 246-7) may be consulted. The attention of Coleopterists should be directed especially to the species of *Dyschirius* which are recorded from Bridlington and Scarborough but not from Filey. *Cassida vibex* and *C. hæmisphærica*, the only Yorkshire records are one specimen of each taken at Filey by Canon Fowler. *Chaetocnema conducta* recently added to the British list by Mr. E. C. Horrell, on the authority of two specimens from Forge Valley, should be looked for. The Boulder Clay Cliffs are prolific in beetles. Sweeping should be tried on the top and grassy sides of the cliffs. The cliff pools to the south are productive of several good water beetles. The Tiger Beetle is abundant on the lower part of Carr Naze. Amongst a long list of records the following may be specially mentioned:—*Nebria livida*, *Bradycellus sharpi*, *Harpalus punctipollis*, *Bembidium anglicanum*, *Cœlambus confluens*, *Hydroporus discretus*, *H. pictus*, *Agabus paludosus*, *Anacæna limbata*, *Chætarthria seminulum*, *Henicocerus exsculptus* *Cercyon depressus*, *Stenus flavipes*, *S. melanopus*, *Corticaria denticulata*, *Atomaria mesomelas*, *Hippodamia variegata*, *H. 13-punctata*, *Subcoccinella 24-punctata*, *Aphodius depressus*, *Corymbites æneus*, *Aphthona nonstriata*, *Adimonia tanaceti*, *Apion tenue*, *Tanysphyrus lemnæ*, *Poophagus sisymbrii*, *Ceuthorhynchus quadridens*, *Sitones lineellus*, *S. humeralis*, *Hypera rumicis*, *H. suspiciosa*, *H. trilineata*, *Tychius schneideri*, *T. lineatulus*, *Coeliodes geranii*, *Phytobius 4. tuberculatus* and *Nacerdes melanura*.

ARACHNIDA.—The Arachnida Committee will be officially represented by its Secretary, Mr. T. Stainforth, B.A. Mr. W. Falconer writes:—A little casual collecting has been done in the district by Mr. T. Stainforth and myself, but so far the list is only numerically small. As the season of the year is one of the best for Arachnida, additions can readily be made. No great rarity is on record for the immediate neighbourhood, but farther north, at Carnelian Bay, I obtained in 1906, a female of one of our rarest British spiders, *Syedra pholcommoides* Camb. Mr. Stainforth adds that *Coelotes atropos* is recorded from Speeton.

PROGRAMME OF MEETINGS on Monday, 1st June:—

4-0 p.m., Meat Tea, 1/9 each.
4-40 p.m., Sectional Meetings.
4-45 p.m., General Meeting.
} At York House, The Crescent, Filey.

The Chair will be taken by the President of the Union.

Trains leave Filey at 5-41 and 8-54 p.m. for Hull; 5-5, 6-18 and 6-42 p.m. for Scarborough; 5-5 and 6-42 p.m. for York, and 5-5 p.m. for Leeds.

NOTICES.

The next Excursion of the Union will be to Bainbridge, on Saturday to Monday, June 27th to 29th.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before June 12th, to W. E. L. Wattam, 30 Towngate, Newsome, Huddersfield.

Yorkshire Naturalists' Union.

THE 252nd MEETING

WILL BE HELD AT

Askrigg for the investigation of the neighbourhood of Bainbridge

On Saturday, June 27th, to Monday, June 29th, 1914.

RAILWAY ARRANGEMENTS—Through return tickets at pleasure party rates will be issued at all stations on the G. C., G. N., H. & B., L. & Y., L. & N. W., Midland & N. E. Railways, which have booking arrangements for Askrigg, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

Tickets taken on Friday or Saturday, June 26th or 27th, will be available for returning any day up to and including Tuesday, June 30th, 1914.

The N.E. Rly. Co. issue Day Tickets at a single fare and an eighth, minimum 1st class fares, 3/-, 3rd class 2/-. Also cheap week-end tickets at a single fare for the double journey, minimum 1st class fares 4/-, 3rd class 2/6.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries or it.

BOOKS AND MAPS.—The whole area is included in Sheets 40 and 50 (formerly 97 N.W. and 97 S.W.) of the one-inch Survey. Both Sheets are to be had geologically coloured. Vol. II. of Phillip's classical work on the "Geology of Yorkshire," should be consulted for detailed particulars, diagrams and sections of the "Yoredale Series of Rocks" of the district, Phillips having adopted the upper end of Wensleydale as a general standard of reference for this interesting group. Dr. Percival compiled a Flora of Wensleydale for the "Naturalist" in 1888, afterwards separately published. Baker's "North Yorkshire" contains geological and botanical information. A list of Wensleydale Birds, by E. Chapman, will be found in the "Naturalist" for 1886. Mr. W. Dennison Roebuck gave a resumè of his Field Notes on Conchology in the same publication for November, 1882, VIII., 52—55. Canon Whaley's History of Askrigg and Bainbridge may be usefully referred to, and so also may Mr. Speight's History of "Richmondshire." The Excursion Circulars of the Meeting at Hawes in June, 1884, and at Askrigg, June, 1905 (No. 187). "The Fungus Flora of Yorkshire," Massee and Crossland (Trans. Y.N.U., parts 28 and 32); "The Birds of Yorkshire," by T. H. Nelson.

HEADQUARTERS—King's Head, at Askrigg, 1¼ miles from Bainbridge, where accommodation is very limited. The terms are 7/6 a day, for bed, breakfast, sandwiches for lunch, and dinner, including attendance. Rooms should be ordered without delay, or disappointment may ensue, the district being a favourite one.

ROUTES.—On arrival of 11-14 train at Askrigg members will proceed on the following routes:—

Route 1. Addlebrough to High Force and thence to Park Scarr. Return by River Bain.

Route 2. Mill Gill, Whitfield Gill and Skell Gill. Late arrivals are advised to take this the shorter route.

Members are particularly warned to avoid meadow land and not to disturb game in the woods or grounds about Semmerwater.

Mr. J. Hartshorn, Mr. W. Balderston, of Yore Bridge House, and Mr J. J. G. Lodge, who are acquainted with the district, have kindly promised to be present at the excursion.

GEOLOGY.—The Geological Section will be officially represented by one of its Secretaries, Mr. John Holmes, Mr. W. Robinson and Mr. Wm. Horne. Mr. W. Robinson writes:—The Upper End of Wensleydale was adopted by Phillips as a standard of reference to the Yoredale Rocks of the Carboniferous System. These rocks consist in the neighbourhood of Bainbridge of the Great Scar Limestone and of five considerable belts of limestone interstatified with shales, flagstones and grits.

Bainbridge lies on the Great Scar Limestone. Thence to the top of Addlebrough, near to, are passed the Hardrow Limestone, the Simonstone Limestone, the Middle Limestone and the Underset Limestone, which forms an escarpment or mural precipice on the top.

Towards the East these limestone beds approximate continually nearer to each other and the beds grow thinner and ultimately are completely extinguished.

Interposed between them here are masses of Sandstone with shales and some thin beds of impure limestone, the space between the underset at the top of Addlebrough and the bed underneath being here as much as 280 feet.

Though published nearly 80 years ago the best account of the Geology of this district is still to be found in Part 2 of "Phillip's Illustrations of the Geology of Yorkshire," on which the foregoing observations are based.

But students wishful to study these rocks in detail should refer to the admirable paper by Professor Garwood in Part 4 of Vol. VIII of the Quarterly Journal of the Geological Society on the Lower Carboniferous succession in the North West of England. The rocks are there dealt with zonally on lines similar to that adopted by Professor Vaughan in the Bristol area. By identifying the fossils named in the zones and sub-zones in Professor Garwood's paper and tracing the faunal horizons through the intermediate districts it would be possible to correlate the limestone rocks of Wensleydale with the Pendlesides on the South West. Mr. Cosmo Johns devoted much time to that interesting work.

As an alternate to the limestones, the Valley, in which the River Bain flows from Semmerwater, may be followed to inspect the multitudinous evidence there visible of the effects of the Glacial epoch.

BOTANY.—The Botanical Section will be officially represented by one of its Secretaries, Mr. C. A. Cheetham, Dr. T W. Woodhead, and Mr. J. Hartshorn.

Flowering Plants.—Mr. J. Hartshorn, writes:—At Ellerbeck, 2½ miles east of Askrigg, *Armeria maritima* abounds, and *Thlaspi occitanum* and *Ophrys muscifera* may also be found. Butterwort and Scurvy Grass are also plentiful. Other interesting plants which occur are:—*Actæa spicata, Draba incana, Viola leutea, Stellaria nemorum, Rhamnus catharticus, Viola sylvatica, Potentilla verna, P. palustris, Saxifraga aizoides, S. hypnoides, Sedum rupestre, Drosera rotundifolia, Hippuris vulgaris, Crepis succisæfolia, Hieraceum crocatum, H. prenanthoides, Pyrola minor, Utricularia, minor, Primula farinosa, Rumex domesticus, Juniperus communis, Habenaria albida, H. chlorantha, Listera cordata, Paris quadrifolia, Potamogeton natans,* and *P. pectinatus.*

Mosses and Hepatics.—The Bryological Section will be officially represented by Mr. Wm. Ingham, B.A., who writes:—

Mosses. On the Countersett side of Semmerwater is one of the very few British habitats for the true and very rare *Hypnum vernicosum* associated with *Hypnum giganteum, H. Wilsoni,* and *Amblystegium filicinum* var. *Vallisclausae.* On the opposite side of the water is abundance of *Cinclidotus fontinaloides.* The bases of the trees near the lake are carpeted with *Leskea polycarpa.*

At Park Scar Fall close by are *Seligeria Doniana, S. tristicha* (very rare moss) *Orthothecium intricatum, Eurhynchium tenellum, E. pumilum* and *Barbula spadicea.*

At the High Force close by are *Seligeria tristicha* and *Trichostomum nitidum.*

At Bainbridge is *Pleuridium alternifolium.*

In Cragdale is *Encalypta ciliata,* and on Addelburgh *Zygodon Stirtoni.*

Hepatics. *Lophozia turbinata* at Park Scar Fall, with promise of other rare species, and *Cephalozia connivens* on Addelburgh. This district is a rich one to the Bryologist.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will probably be officially represented.

Mammals.—Foxes are numerous, and Badgers rare. Otters are not uncommon in the streams. Stoats, Weasels, Hedgehogs, Bank Vole, Field Vole, Water Vole, Squirrel, Dormouse, Longtailed Field Mouse, Longeared Bat, Noctule, Pipistrelle, and Mole also occur.

Birds.—Mr. Lodge writes:—The birds found in the district are Kestrel, Sparrow Hawk, Buzzard, Peregrine, Grey Crow, Carrion Crow, Tawny and Little Eared Owls, Redshank, Heron, Sandpipers, Dipper, Coot, Waterhen, Dabchick, Kingfisher, Solitary, Common and Jack Snipe, Curlew, Golden and Green Plovers, Grouse, Blackgame, Redstart, Warblers, Whitethroat, Wagtails, Bullfinch, Flycatcher, Waxwing, Crossbill, etc.

In the winter time, Semmerwater is frequented by many water fowl, Ducks, Geese and Swans having been shot there. About 30 years ago a pair of Black headed gulls came into the valley, and every year since have come in March in increasing numbers, going away in September.

Fishes and Amphibia.—Mr. Horne writes:—The following are found in the waters in the neighbourhood: Trout, Grayling, Eels, Bream, Rudd, Minnows, Stone Loach, Miller's Thumb or Bullhead, Newts.

CONCHOLOGY.—Mr. W. Denison Roebuck writes that in August, 1882, he investigated Semmerdale, finding 27 species. *Anodonta anatina* abounds in Lake Semmerwater. Other records are:—*Limnæa truncatula, Ancylus fluviatilis,* v. *gibbosa, Arion ater, A. hortensis, Agriolimax agrestis, Succinea putris, Vitrina pellucida, Hyalinia cellaria, H. alliaria, H. nitidula, H. radiatula, H. crystallina, Helix hortensis, Helicigona arbustorum, Hygromia rufescens, H. hispida, H. granulata, Pyramidula rotundata, P. rupestris, Pupa cylindracea, Vertigo pygmæa, Balea perversa, Clausilia bidentata, C. cravenensis* and *Zua lubrica.*

ENTOMOLOGY.—The Entomological Section will probably be officially represented.

Lepidoptera.—Mr. G. T. Porritt states that there are practically no records.

Coleoptera.—The Coleoptera Committee will be officially represented by Mr. M. L. Thompson, who writes:—The following species were met with at Askrigg in 1905. *Chrysomela varians, Phyllodecta vulgatissima, Apion punctigerum, Coeliodes geranii.* On the border of Semmerwater occurred *Chlaenius nigricornis* and *Anchomenus viduus*, var. *moestus*, and more recently *Dianous coerulescens.*

ARACHNIDA.—The Arachnida Committee will probably be officially represented.

Mr. W. Falconer, writes:—There are no spider records for Wensleydale, but the first recorded Yorkshire examples of the false scorpions *Chthonius rayi*, L. Koch and *Obisium muscorum* Leach were taken beneath stones at Aysgarth, in April, 1903 (vide "Naturalist," August, 1903). Both the season and the locality are favourable to all orders of the Arachnida, and a good list could easily be made.

Crustacea.—Mr. W. Denison Roebuck states that Crayfish swarm in Semmerdale.

PROGRAMME OF MEETINGS on Saturday:—

3-45 p.m., Meat Tea, 1/9.
4 15 p.m., Sectional Meetings. } At King's Head Inn.
4-20 p.m., General Meeting.

Members requiring tea on Saturday must please communicate direct to King's Head Inn.

The Chair will be taken by the President of the Union.

Trains.—N.E. for Northallerton and York 3-44 and 6-49 p.m. Midland for Bradford and Leeds 5-22 p.m. There is a train on Sundays to Northallerton at 5-45 p.m , due in York at 9 p.m.

NOTICES.

The next Excursion of the Union will be to Whitby, (for Glaisdale), August Bank-Holiday Week-end, 1st to 3rd August.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before July 10th, to W. E. L. Wattam, 30 Towngate, Newsome, Huddersfield.

CIRCULAR 253.

Yorkshire Naturalists' Union.

President:

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

Ex-Presidents:

JOHN GILBERT BAKER, F.R.S., F.L.S., Kew.
Rt. Hon. LORD WALSINGHAM, M.A., F.R.S., Thetford, Norfolk.
Sir RALPH PAYNE GALLWEY, Bart, M.B.O.U., Thirkleby Park.
HENRY EELES DRESSER, F.L.S., F.Z.S., London.
R. H. TIDDEMAN, M.A., F.G.S., Oxford.
ROBERT BRAITHWAITE, M.D., F.L.S., London.
Prof. W. BOYD DAWKINS, M.A., F.R.S., Manchester.
GEORGE T. PORRITT, F.L.S., F.E.S., Huddersfield.
Prof. PERCY F. KENDALL, M.Sc., F.G.S., Leeds.
W. DENISON ROEBUCK, F.L.S., Leeds.
A. H. PAWSON, J.P., F.L.S., F.G.S., London.
G. W. LAMPLUGH, F.R.S., F.G.S., London.
W. EAGLE CLARKE, F.R.S.E., Edinburgh.
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W. H. ST. QUINTIN, J.P., D.L., M.B.O.U., Scampston, York.
Prof. A. C. SEWARD, M.A., F.R.S., Cambridge.
ALFRED HARKER, M.A., F.R.S., Cambridge.
JOHN W. TAYLOR, Leeds.
HAROLD WAGER, F.R.S., F.L.S., Leeds.

Divisional Secretary:

J. J. BURTON, F.G.S., "Rosecroft," Nunthorpe, R.S.O., Yorks.

Hon. Secretaries:

T. W. WOODHEAD, Ph.D., F.L.S., Technical College, Huddersfield.
W. E. L. WATTAM, 30 Towngate, Newsome, Huddersfield.

Hon. Treasurer:

EDWIN HAWKESWORTH, Sunny Side, Cross Gates, Leeds.

THE 253rd MEETING

WILL BE HELD AT

SLEIGHTS

For an investigation of GLAISDALE & DISTRICT,

On Saturday, August 1st, to Monday, August 3rd, 1914.

RAILWAY ARRANGEMENTS—Through return tickets at pleasure party rates will be issued at all stations on the G. C., G. N., H. & B., L. & Y., L. & N. W., Midland & N. E. Railways, which have booking arrangements for SLEIGHTS, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

Tickets taken on Friday or Saturday, July 31st or August 1st, will be available for returning any day up to and including Tuesday, August 4th, 1914.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it.

BOOKS AND MAPS.—The District for investigation is included in the following Ordnance Sheets:—One-inch 35, 43 and 44. Geological Maps (one-inch) 43 and 44, new series; 96 N.E. and 95 N.W., old series; Geological Maps (six-inch) 31 and 45, and 32 and 46. Reference may also be made to Phillips' Yorkshire: Memoirs of Geological Survey, Eskdale, Rosedale, &c.;

and Jurassic Rocks of Britain, vol. 1, C. Fox-Strangways; Yorkshire Lias, by Tate and Blake; Quarterly Journal of the Geological Society of London, vol. lviii., pp. 472—571; or a condensed paper in the Yorkshire Geological Society's Proceedings, vol, vx., part 1, by Professor Percy F. Kendall, F.G.S.; Baker's "North Yorkshire;" "The Moorlands of North-Eastern Yorkshire," by Frank Elgee, F.G.S.; "The Fungus Flora of Yorkshire," Massee and Crossland (Trans: Y.N.U., parts 28 and 32); "The Birds of Yorkshire," by T. H. Nelson, M.B.O.U.; "List of Yorkshire Lepidoptera," by G. T. Porritt, F.L.S., F.G.S.; Y.N.U. Circular for August, 1885, and No. 168 (September, 1902).

HEADQUARTERS.—The Headquarters will be at Sleights Hall, about half a mile up hill from Sleights Station. The accommodation is ample if applied for in time, but is quickly absorbed in the holiday season. Single beds in bungalow in garden if preferred. Terms—Bed, Breakfast, Sandwiches, and late Dinner, 6/- per day. Application should be made at once to

Mrs. Rennison, The Hall, Sleights, S.O., Yorks,

who will procure beds outside if the Hall is full.

DISTRICT.—The Esk Valley from Whitby to Glaisdale is extremely picturesque. The lower ground is well sheltered and wooded. The Moors on the Whitby-Pickering Road are within one mile of Headquarters, within which distance there is a rise of 500 feet. All sections are likely to find this district favourable for investigation.

ROUTES.—On Saturday all parties will await the arrival at Sleights of the 10-21 a.m. train from Whitby, and will travel by the same train to Egton, walk from Egton through Arncliffe Woods to Glaisdale, and up part of Glaisdale. All will assemble at the Institute, Glaisdale, at 4 p.m., where the Glaisdale friends have kindly intimated a desire to offer a welcome and Afternoon Tea. The Divisional Secretary will be glad of a post card from members who expect to be present. Train, Glaisdale to Sleights, 6-8 p.m.

On Monday—Iburndale and Little Beck, or Whitby Coast or Aislaby. To be fixed by members present, not leaving Headquarters before 9-30 a.m. Word will be left at the Station as to route adopted.

PERMISSION to visit their estates has kindly been granted by the following gentlemen:—For Glaisdale, Edwin Harry Davis, Esq., J.P. For Egton and Arncliffe, Kenneth Foster, Esq., J.P., but members must keep to the paths. Permission is also kindly granted to visit the grounds at Egton Lodge. For Little Beck, E. C. Brooksbank, Esq. No plants must be removed. Members, when traversing Mr. Brooksbank's estate, are also requested to keep together as much as possible.

GEOLOGY.—The Geological Section will be officially represented by one of its Secretaries, Mr. John Holmes, and by Mr. J. J. Burton.

Mr. J. J. Burton writes:—The physical features and the solid geology of the Glaisdale district are full of variety and interest. The river Esk, which rises in the Cleveland moorlands to the West and pursues an eastward course, mostly through a deep narrow valley, is remarkable for its sinuous curves, elbow bends and S loops until it empties itself into the sea at Whitby. On its northern banks there is no lateral valley of any importance, and the streams feeding it are for the most part short and insignificant, merely bringing down the rainfall of the valley slope. On the south side, however, besides the Gorge of Newton Dale there are many valleys which have been cut deep down into the moorland plain at right angles to the Esk and end abruptly in a combe-like cirque at the head of each dale. The streams in these short lateral valleys are rapid, copious and sometimes turbulent. The one notable exception to the general character is the Murk Esk and its tributaries, which bring down the drainage of the water shed about 1,400 feet above sea level dividing the Esk from the Rye systems. Except in length the Murk Esk is probably the more important stream. The two streams unite at Grosmont.

It is to the cutting out of these narrow valleys to the south that we owe so much of the picturesqueness of the district chosen for investigation. The glaciation of the area has been very fully investigated by Professor P. Kendall, and his remarkable contribution to the solution of many difficulties read before the Geological Society should be referred to prior to the meeting. It may, however, be mentioned here that the Esk Valley has been ice-blocked, and its pre-glacial floor is much below the present river bed. On the recession of the ice the amount of drift left has in several cases diverted the course of the stream, and in the case of Crockley gill, and again near Egton, caused it to cut out fresh channnels in the solid rock.

The solid geology is of a simple type. The moors are capped with lower oolite. Those to the south form an east and west anticline with a sharp dip of the strata towards the Esk. The lowest beds in the area to be visited are a portion of the Lower Lias exposed near Grosmont, but there are many cliff sections of the Middle and Upper Lias, and also of the Estuarines.

The cliff sections of the Lias at Whitby are too well known to need any description here.

BOTANY.—The Botanical Section will be officially represented.

Flowering Plants.—Dr. W. G. Smith, B.Sc., writes :—Glaisdale, with its variety of stream-side and valley slope woods leading up to wet and dry moorland, offers good opportunities for observing most of the representative plants of the dales and moors of North-East Yorkshire. A perusal of a number of lists from various parts of the district does not, however, reveal any very rare species. The slag heaps, although still rather bare, except for large patches of *Epilobium angustifolium*, might on careful examination reveal some alien or uncommon species. Arncliffe Woods and their extension up Glaisdale form one of the largest areas of woodland in North-East Yorkshire. Oak is well represented by *Quercus sessiliflora*, *Q. Robur*, and we have observed numerous intermediate forms. Most of the commoner woodland trees will be found in one part or another of the more natural woods or in the plantations. In examining the woods the Botanists will find that the ground vegetation coincides fairly closely with the degree of moisture. The upper slopes are dry and not too productive ; lower down, numerous springs emerge, and with them comes a more abundant flora ; here and there Alder thickets occupy a still wetter type of soil.

Mosses and Hepatics.—Mr. W. Ingham, B.A., writes ;—Glaisdale is a very rich district for all the branches of Bryophytes. A few of interest only can be mentioned here.

I. *Sphagna*, *S. compactum* var. *imbricatum* on Sleights Moor, *S. squarrosum* var. *spectabile*, *S. turfaceum*, and *S. subnitens* var. *virescens* forma *squarrosula* in Arncliffe Wood and *S. Girgensohnii* in Cronkley Gill.

II. *True Mosses*, *Fissidens pusillus*, *Heterocladium heteropterum*, *Dicranum fuscescens* and *Campylostelium saxicola* in Cronkley Gill, *Dicranum fulvellum*, *Hypnum eugyrium*, *Dichodontium flavescens*, *Hypnum ochraceum* var. *flaccidum* and the type fruiting which is very rare, and *H. fluitans* group *Amphibium* var. *atlanticum* forma *tenella* in Arncliffe Wood, the last *f. tenella*, being the first so named by Renauld, and *Campylopus atrovirens* on Sleights Moor.

III. *Hepatics*. *Pellia Neesiana*, male plant, *Metzgeria conjugata*, *Aneura multifida*, *Aliculavia compressa*, *Eucalyx paroicus* (very fine), *Haplozia sphaerocarpa*, *Liochlaena lanceolata*, *Lophozia incisa*, *L. barbata*, *Lophocolea cuspidata*, *Harpanthus scutatus*, *Cephalozia Lammersiana* var. *serratiflora* (known only here and in S. Lancashire), *Blepharostoma trichophyllum* (in large pure patches on stone), *Scapania nemorosa*, *S. dentata*, *S. intermedia*, *S. umbrosa*, all in Arncliffe Wood, and *S. curta* on Sleights Moor.

The very rare *L. lanceolata* also in Cronkley Gill.

N.B.—The Cronkley Gill is about 3 miles from Glaisdale, and the Arncliffe Wood above is that end of it near Glaisdale.

Fungi.—The Mycological Committee will be officially represented by Miss C. A. Cooper and Mr. A. E. Peck. For report of Fungus Foray held in Eskdale in September, 1902, see "The Naturalist" for that year, pp, 355—365.

VERTEBRATE ZOOLOGY.—The Vertebrate Section will probably be officially represented.

CONCHOLOGY.—This Section will probably be officially represented.

ENTOMOLOGY.—The Entomological Section will be officially represented by Mr. G. T. Porritt.

Lepidoptera.—Mr. T. A. Lofthouse writes :—The district to be visited is one that has been very little worked by Lepidopterists, and should be productive of many good species. Among Lepidoptera that I know to have been taken in the district are :—*Thecla rubi*, *C. typhon*, *C. elpenor*, *M. stellatarum*, *M. mundana*, *N. plantaginis*, *H. sylvanus*, *H. velleda*, *B. rubi*, *B. quercus*, *S. pavonia*, *A. menyanthidis*, *C. haworthii*, *A. agathina*, *N. maura*, *O. suspecta*, *C. xerampelina*, *A. occulta*, *H. glanca*, *P. iota*, *P. interrogationis*, *G. papilionaria*, *A. fumata*, *S. belgiaria*, *L. caesiata*, *Eup. pulchellata*, *H. ruberata*, *M. galiata*, *T. viburniana*, *P. bicostella*.

Neuroptera.—Mr. Porritt states that the district is rich in Neuroptera and Trichoptera, and many interesting species should occur.

Coleoptera.—The Coleoptera Committee will be officially represented by Mr. M. L. Thompson.

The following notes have been supplied by Messrs. M. L. Thompson and G. B. Walsh, B.Sc. :—The district has always been an interesting one to the Coleopterist, especially Arncliffe Wood, Glaisdale, in which a single specimen of the very rare *Agabus tarsatus* (*melanarius*) was found 20 years ago. Although August is late for most of the moorland beetles, the following may be obtained by sifting grass tufts and reeds in damp places :—*Bradycellus similis*, *B. cognatus*, *B. collaris*, *Calathus micropterus*, *Olisthopus rotundatus*, *Quedius boops* and *Othius myrmecophilus*. Sweeping heather gives *Haltica ericeti*, *H. montana*, *Strophosomus lateralis* and *Ceuthorrhynchus ericæ*. Under stones in the river bed occur *Bembidium decorum*, *Platambus maculatus* (abundant and very variable), *Helophorus arvernicus*, *Dianous cærulescens*, *Stenus guttula* and *Platystethus arenarius*. Sifting beech leaves in a damp spot in the gorge of the river just below the village has yielded abundance of *Quedius fumatus*, *Q. nigriceps*, *Q. picipes* and *Q. lateralis*. Other beetles recorded for Glaisdale are *Cicindela campestris*, *Anthophagus testaceus*, *Leiopus nebulosus*, *Nebria gyllenhali*, *Serica brunnea*, *Hydroporus incognitus*, *H. nigrita*, *H. memnonius*, *Gyrophæna minima*, and *Phædon armoraciæ*. In the neighbourhood of Sleights, *Stomis pumicatus*, *Amara communis*, *Donacia discolor*, *Aspidiphorus orbiculatus* and *Strophosomus retusus* have been met with.

ARACHNIDA.—The Arachnida Committee will be officially represented.

Mr. W. Falconer writes :—The woods, dales and moors of North-East Yorkshire have yielded in the past several rare and welcome additions to the county list, and probably if the basin of the Esk were investigated more thoroughly than has been done up to the present a similar result might be recorded. Chiracanthium carnifex Fabr. and Mengea scopigera Grube, which are apparently local in the county, have been taken on the Whitby Moors, and the only Yorkshire examples of Theridion simile, C. L. Koch (2 females) occurred on furze in 1906 near Goathland Station.

PROGRAMME OF MEETINGS on Monday, August 3rd:

4-0 p.m., Meat Tea, 1/6 each.
4-45 p.m., Sectional Meetings.
5-0 p.m., General Meeting.
} At Sleights Hall.

N.B.—Members are particularly requested to note that Tea will only be provided for those who write Mrs. Rennison ordering same at least two days beforehand, and if ordered it must be paid for if not taken.

The Chair will be taken by the President of the Union.

Train Service.

Access to Sleights and Glaisdale is by York, Malton, Pickering and Grosmont ; by the Bridlington, Scarboro' and Whitby coast line ; or by Northallerton, Picton and Whitby route.

The following may be a guide, but members must look up their own time tables, as Bank Holiday alterations are common :—

Leeds to Sleights by Picton	leave 5-0 a.m.	1-52 p.m.	3-38 p.m.	5-40 p.m.	
Due Sleights	9-23 a.m.	6-4 p.m.	7-36 p.m.	10-8 p.m.	
York, Pickering, Sleights.....	leave 5-43 a.m.	3-30 p.m. Whitby.	6-12 p.m.	6-55 p.m.	
Due Sleights	8-4 a.m.	5-32 p.m.*	8-2 p.m.	8-53 p.m.	
	A	B	A	B	C
Hull to Whitby.....	leave 5-40 a.m.	6-50 a.m.	4-50 p.m.	5-5 p.m.	6-5 p.m.
Due Whitby	9-51 a.m.	10-51 a.m.	7-50 p.m.	8-10 p.m.	9-4 p.m.

Note.—Sleights is 3 miles from Whitby, and there are numerous trains both ways.
* Fridays and Saturdays only. A By coast. B By Market Weighton and York. C Via Driffield.

Departure Trains.

For Hull and Whitby	Leave Sleights	6-4 p.m. and 6-22 p.m.
For Stockton and Middlesbro'.....	,,	5-45 p.m. and 8-5 p.m.
For Pickering, Malton, York and Leeds ...	,,	7-17 p.m. and 9-18 p.m.

NOTICES.

The next Excursion of the Union will be to Doncaster, on Saturday, 19th September.

In order that an early account of the excursion may appear in the "Naturalist," notes and reports should be forwarded before August 14th, to W. E. L. Wattam, 30 Towngate, Newsome, Huddersfield.

CIRCULAR 254.

Yorkshire Naturalists' Union.

President:

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

Ex-Presidents:

JOHN GILBERT BAKER, F.R.S., F.L.S., Kew.
Rt. Hon. LORD WALSINGHAM, M.A., F.R.S., Thetford, Norfolk.
Sir RALPH PAYNE GALLWEY, Bart, M.B.O.U., Thirkleby Park.
HENRY EELES DRESSER, F.L.S., F.Z.S., London.
R. H. TIDDEMAN, M.A., F.G.S., Oxford.
ROBERT BRAITHWAITE, M.D., F.L.S., London.
Prof. W. BOYD DAWKINS, M.A., F.R.S., Manchester.
GEORGE T. PORRITT, F.L.S., F.E.S., Huddersfield.
Prof. PERCY F. KENDALL, M.Sc., F.G.S., Leeds.
W. DENISON ROEBUCK, F.L.S., Leeds.
A. H. PAWSON, J.P., F.L.S., F.G.S., London.
G. W. LAMPLUGH, F.R.S., F.G.S., London.
W. EAGLE CLARKE, F.R.S.E., Edinburgh.
CHARLES CROSSLAND, Halifax.
Dr. WHEELTON HIND, M.D., B.Sc., F.G.S., Stoke-on-Trent.
W. H. ST. QUINTIN, J.P., D.L., M.B.O.U., Scampston, York.
Prof. A. C. SEWARD, M.A., F.R.S., Cambridge.
ALFRED HARKER, M.A., F.R.S., Cambridge.
JOHN W. TAYLOR, Leeds.
HAROLD WAGER, F.R.S., F.L.S., Leeds.

Divisional Secretary:

J. J. BURTON, F.G.S., "Rosecroft," Nunthorpe, R.S.O., Yorks.

Hon. Secretaries:

T. W. WOODHEAD, Ph.D., F.L.S., Technical College, Huddersfield.
W. E. L. WATTAM, 30 Towngate, Newsome, Huddersfield.

Hon. Treasurer:

EDWIN HAWKESWORTH, Sunny Side, Cross Gates, Leeds.

THE 254th MEETING

WILL BE HELD AT

SANDSEND,

(Near Whitby),

FOR

Mycological Research in Mulgrave Woods

AND ADJOINING DISTRICT,

From Saturday, Oct. 3, to Thursday, Oct. 8, 1914.

Chairman of Mycological Committee:

GEORGE MASSEE, V.M.H., etc., of the Herbarium, Royal Botanic Gardens, Kew.

Hon. Secretary, Mycological Committee:

CHAS. CROSSLAND, 4 Coleridge Street, Halifax.

RAILWAY ARRANGEMENTS—Through return tickets at pleasure party rates will be issued at all stations on the G. C., G. N., H. & B., L. & Y., L. & N. W., Midland & N. E. Railways, which have booking arrangements for SANDSEND, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Tickets will be available for the outward journey from October 2nd to October 8th inclusive, and for return up to, and including October 9th. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fare being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it.

The N.E. Rly. Co. issue week-end tickets from all their stations on Friday, Saturday, and up to mid-day on Sunday, to Sandsend, at a single fare and a quarter for the double journey, minimum 1st class 4/-, 3rd class 2/6. The return journey can be made with these tickets on Monday, or Tuesday.

PERMISSION to pay a seventh extension visit to the woodlands on the estates connected with Mulgrave Castle has been granted by the Rev. the Marquess of Normanby. Last year it was again further considered advisable to continue the investigation for still another season.

HEADQUARTERS are at Mrs. T. Kidd's, Normanby House, Sandsend. Members must write direct to Mrs. Kidd to secure accommodation. The Work Rooms are at the School close by, Monday, Tuesday, and Wednesday.

ROUTES will be set out each morning.

PAPERS will be read, and Talks given as follow :—

Saturday Evening—

"Fungi from Various Standpoints," by Mr. GEO. MASSEE, V.M.H.

Monday Evening—

"The Development of the Basidia in Tremella and Dacryomyces," by Mr. HAROLD WAGER, F.R.S.

"Mycena galericulata and its Allies," by Miss IVY MASSEE.

Tuesday Evening—

"Notes on some Fungi of the Sea-shore," by Sir H. C. HAWLEY, Bart.

Wednesday Evening—

Business Meeting, 8-30.

Miss Massee and Mr. Clarke will have a series of coloured drawings for inspection. There will also be a series of coloured Lichen drawings.

Mycologists are expected to bring their Books, Microscopes, etc.

Yorkshire Marine Biology Committee.

Chairman - - - - J. Irving, M.D., Scarborough.
Convener - Rev. F. H. Woods, B.D., Bainton, Driffield.

A MEETING

of the Marine Biology Committee will be held at

WHITBY

From Friday, Sept. 18th, to Tuesday, Sept. 22nd, 1914.

Headquarters—Princess Royal, West Cliff, Whitby.

RAILWAY ARRANGEMENTS—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N, H. & B., L. & Y., L. & N. W., Midland & N. E. Railways, which have booking arrangements for Whitby, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. The tickets will be available for the outward journey from Sept. 17th to Sept. 22nd, and will be available for returning any day up to and including Wednesday, Sept. 23rd, 1914. Where through bookings are not in operation, Members may book to the most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

N.B. The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it.

The N. E. Rly. Co. issue week-end tickets from all their stations on Friday, Saturday, and up to-mid-day on Sunday to Whitby, at a single fare and a quarter for the double journey, minimum 1st class 4/-, 3rd class 2/6. The return journey can be made with these tickets on Sunday, Monday, and Tuesday.

In the daytime, especially the mornings when the tide is low, excursions will be made in search of forms of marine life, and each evening there will be discussions on the specimens collected. There will be lectures on subjects connected with Marine Biology.

Accommodation.—Suitable accommodation can be secured at the Princess Royal, West Cliff, Whitby, at 6/- per day, but notice should be sent to Mr. Woods to reach him **not later than Thursday, Sept. 17th**, stating whether he wishes a separate room, and the number of days for which accommodation is required.

Whitby is the centre of a very active Naturalists' Club, who have kindly promised to give all assistance in their power.

The Committee will give a hearty welcome to those interested in any branch of Marine Biology.

MEMBERS are requested to note that the Excursion to Doncaster, fixed for Saturday, 19th September, has been abandoned owing to the war. Doncaster being one of the centres for military purposes, suitable accommodation cannot be obtained.

FURTHER MEETINGS of the Union are as follows:—

SECTIONAL MEETINGS.

Botanical Section, Annual Meeting, at Leeds, Saturday, 17th Oct., 1914.

Entomological Section, Annual Meeting, at Leeds, Saturday, 31st Oct., 1914.

Conchological Section, Annual Meeting, at Leeds University, Saturday, 14th Nov., 1914.

Geological Section, Annual Meeting, at Hull, Saturday, Nov. 7th, 1914.

Vertebrate Zoology.—Saturdays, Nov. 21st, 1914, and Feb. 20th, 1915, at the Leeds Institute.

ANNUAL MEETING, at the University, Leeds, on Saturday, 5th Dec., 1914.

These dates, etc., are subject to such alterations as may be necessitated by local considerations.

CIRCULAR 255.

Yorkshire Naturalists' Union.

President:

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

President-Elect:

RILEY FORTUNE, F.Z.S., Harrogate.

Ex-Presidents:

JOHN GILBERT BAKER, F.R.S., F.L.S., Kew.
Rt. Hon. LORD WALSINGHAM, M.A., F.R.S., Thetford, Norfolk.
Sir RALPH PAYNE GALLWEY, Bart, M.B.O.U., Thirkleby Park.
HENRY EELES DRESSER, F.L.S., F.Z.S., London.
R. H. TIDDEMAN, M.A., F.G.S., Oxford.
ROBERT BRAITHWAITE, M.D., F.L.S., London.
Prof. W. BOYD DAWKINS, M.A., F.R.S., Manchester.
GEORGE T. PORRITT, F.L.S., F.E.S., Huddersfield.
Prof. PERCY F. KENDALL, M.Sc., F.G.S., Leeds.
W. DENISON ROEBUCK, F.L.S., Leeds.
A. H. PAWSON, J.P., F.L.S., F.G.S., London.
G. W. LAMPLUGH, F.R.S., F.G.S., London.
W. EAGLE CLARKE, F.R.S.E., Edinburgh.
CHARLES CROSSLAND, Halifax.
Dr. WHEELTON HIND, M.D., B.Sc., F.G.S., Stoke-on-Trent.
W. H. ST. QUINTIN, J.P., D.L., M.B.O.U., Scampston, York.
Prof. A. C. SEWARD, M.A., F.R.S., Cambridge.
ALFRED HARKER, M.A., F.R.S., Cambridge.
JOHN W. TAYLOR, Leeds.
HAROLD WAGER, F.R.S., F.L.S., Leeds.

Divisional Secretary:

A. WHITAKER, Kingwell Close, Worsborough Dale, nr. Barnsley.

Hon. Secretaries:

T. W. WOODHEAD, Ph.D., F.L.S., Technical College, Huddersfield.
W. E. L. WATTAM, 30 Towngate, Newsome, Huddersfield.

Hon. Treasurer:

EDWIN HAWKESWORTH, Sunny Side, Cross Gates, Leeds.

THE 255TH MEETING

AND

53rd ANNUAL MEETING

WILL BE HELD AT **THE UNIVERSITY,**

LEEDS

PRECEDED BY AN EXCURSION UP THE MEANWOOD VALLEY TO ADEL,

ON

SATURDAY. DECEMBER 5th, 1914.

RAILWAY ARRANGEMENTS—Through return tickets at pleasure party rates will be issued at all stations on the G. C., G. N., H. & B., L. & Y., L. & N. W., Midland & N. E. Railways, which have booking arrangements for LEEDS, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. The Tickets will be issued on Friday, the 4th, and Saturday, the 5th December, and will be available for returning on Saturday, 5th, and up to and including the Monday, December 7th, 1914. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fare being available for each stage of the journey.

At Stations on the North Eastern Railway, Week-end Tickets will be issued at single fare and a quarter for the double journey (minimum 2/6 Third Class). Similar Tickets are issued from many Stations on other Compan es' lines.

N.B. The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to either of the Hon. Secretaries for it.

PROGRAMME.

10-30 a.m. Excursion.

All parties, under the guidance of Mr. Albert Gilligan, B.Sc., F.G.S., will meet outside Grove Mills, Meanwood Road, and proceed up the Meanwood Valley as far as Adel. There is a frequent service of tram cars from the Corn Exchange.

Mr. Gilligan writes :—Meanwood Beck rises about two miles N.W. of Adel, and after a course of about 8 miles empties itself into the Aire, south of Leeds. The Roman Camp and Norman Church at Adel are well known to all Yorkshire Archæologists, while the neighbourhood of Adel Moor and Crags is much frequented by lovers of the picturesque. The upper part of the course of the Beck is over a series of alternating beds of grits and shales of the Millstone Grit Series, and the varying hardness of these beds has, in a conspicuous manner, determined the character of the valley. The Millstone Grit Series dip down stream so that the older beds are exposed in the upper part of the course, and newer beds appear as one descends the valley. At Meanwoodside the valley is crossed in an east and west direction by the great boundary fault of the Yorkshire Coalfield. This fault has a downthrow to the south of some six to seven hundred feet, bringing Elland Flags against the Rough Rock. Just south of the fault a borehole has been put down in search of water, and the core has been carefully examined by the author with interesting results in the way of fossils.

Excellent beds of ganister are found in the Lower Coal Measures near Woodhouse Ridge, and this has long been worked for making Silica bricks. In the quarries opened for this purpose fine examples of Sigillaria and Stigmaria in situ were found from time to time Unfortunately these are now covered up as is also a good exposure of a reversed fault in the same bed.

Photographs of these by Mr. Godfrey Bingley, can be seen in the Proceedings of the Leeds Geological Association.

Glacialists will find much of interest in the drift to be seen here, which contains abundant ganister pebbles and some chert. This drift can be traced through West Park, Headingley and Horsforth, to the Aire Valley, and it seems clear that it was deposited by a lobe of the Aire Valley Glacier which extended over the area mentioned.

The Museum.

Those who cannot make it convenient to attend the above excursion will find much to interest them in the Leeds Museum. The President and Council of the Philosophical and Literary Society kindly invite members to visit the Museum. They will be admitted free on showing Member's or Associate's Card. There is also an interesting Archæological collection in the Art Gallery, near the Town Hall.

1-0 p.m. to 2-15 p.m. Luncheon

Can be obtained at any of the numerous restaurants in the city.

The 53rd Annual Meeting

will be held in the **New Education Lecture Theatre, Leeds University.** by kind permission of the Pro-Chancellor and Vice-Chancellor of the University.

2-30 p.m. The Sectional Meetings

(which all Members and Associates are entitled to attend) will be held in the New Education Lecture Theatre, for the election of Officers of Sections, and to receive the Annual Reports from the Secretaries.

3-0 p.m. The General Committee

(each member of which receives a special invitation with this circular), will meet to consider the Annual Report, elect Officers, and arrange the Excursion Programme for 1915.

5-0 p.m. Tea

can be obtained in the University Refectory, 1/6 each.

6-30 p.m. The General Meeting

of Members and Associates will be held in the New Education Lecture Theatre. The Chair will be taken by the President of the Union, supported by The Right Honourable the Lord Mayor of Leeds, J. E. Bedford, Esq., F.G.S., Dr. Michael E. Sadler, the Vice-Chancellor of the University, and other prominent members. After the reading of the Annual Report, the announcement of the Excursion Programme for 1915, and the Election of New Members,

The Presidential Address

will be delivered from the chair by Mr. Thomas Sheppard, F.G.S., F.S.A. (Scot.), Hull, subject :—" YORKSHIRE'S CONTRIBUTION TO SCIENCE."

Conversazione.

After the delivery of the Presidential Address, a Conversazione (under the auspices of the Leeds Naturalists Club and Scientific Association, Leeds Geological Asoociation, Leeds Co-operative Field Naturalists Club, and the Leeds Conchological Club, will be held in the Biological Department of the University, to which all Members and Associates of the Union are cordially invited.
Refreshments will be kindly provided by the inviting Societies.

Exhibition of Specimens.

A number of objects of interest will be on view, a detailed programme of which will be distributed on the day of the meeting.
Associates intending to be present should apply to Mr. C. H. Grant, M.Sc., 222 Burley Road, Leeds, for invitation cards. Acceptance should be sent not later than Thursday, December 3rd.

Election of Six Additional Members of General Committee.

Voting papers are not sent out this year, but members may vote by post card addressed to the Secretaries, The Technical College, Huddersfield.

New Members.

A special effort is being made to get a good addition of members. Towards this the Hon. Secretaries would be glad to receive any nominations. The Subscription is 10/6 per annum, and members receive *The Naturalist, Transactions,* etc., free. The new volume of *The Naturalist,* commences on January 1st.

Trains

Bradford (Midland) 8-30, 9-20, 9-40, 10-8, 10-10.
Halifax, 8-50, 9-50, 10-58.
Huddersfield (old line), 8-5, 8-15, 9-25, 10-10, 10-40.
(new line) 8-0, 8-35, 11-0.
York, 8-0, 8-25, 9-20, 10-50.
Hull, 8-0, 9-50, 11-10.

Yorkshire Naturalists' Union.

.....19

..... [*Signature and Titles*].

.....

..... [*Address*].

wishes to become a Member of the Yorkshire Naturalists' Union, and will subscribe HALF-A-GUINEA (10/6) per annum, until the end of the year in which written resignation is given.

.....
.....
} [*Signature of Proposer and Seconder*].

Elected.....19 *at*.....

.....*Chairman's Signature.*

This form, when filled up and signed, should be sent to the Secretaries of the Union, accompanied by the amount of the first year's subscription.

The subscription of 10/6 entitles the members to receive the Union's monthly magazine, "The Naturalist," as well as the "Transactions."

Persons related to and resident in the family of a member are admitted as 5/- members, to enable them to attend exoursions, but not receiving the publications.

Qualification for Life Membership:—A Donation of 7 Guineas.