NORTH STAFFORDSHIRE

NATURALISTS' FIELD CLUB

AND

ARCHÆOLOGICAL SOCIETY.

ANNUAL REPORT

AND

TRANSACTIONS

Vol. xxix.

STOKE-UPON-TRENT:
VYSE & HILL, PRINTERS, WOLFE STREET & CHURCH STREET.
1895.

ICICLES NEAR STONE.

From a Photo. by Mr J. S. Redman, Stone.

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Excursions and Evening Meetings

For 1895-96.

EXCURSIONS.

1—Saturday, April 20th ... ... Marston Salt Mine.
Leader—Mr. CHARLES E. De RANCE.

2—Thursday, May 16th ... ... Macclesfield Forest.
Leader—Mr. F. BARKE.

3—Monday, June 24th to Monday, July 1st The Norfolk Broads and Norwich.
Leader—The PRESIDENT.

4—Saturday, July 20th ... ... Chrome Hill and the Dove.
Leader—Mr. A. T. DANIEL.

5—Tuesday, August 20th ... ... Wirksworth.
Leader—Mr. C. LYNAM.

6—Tuesday, Sept. 17th ... ... Ribden and Cauldon Low.
Leader—Mr. W. S. BROUGH.

7—Saturday, October 12th... ... ... Lichfield.
Leader—Mr. ALEX. SCRIVENER.

EVENING MEETINGS.

1—Wednesday, November 20th ... ... Stoke.
Local Secretary—Mr. J. KIRKBY.

2—Wednesday, December 11th ... ... Tunstall.
Local Secretary—Mr. D. SHERWIN.

3—Wednesday, January 22nd ... ... Hanley.
Local Secretary—Mr. J. W. MOORE.

4—Thursday, February 20th ... ... Cheadle.
Local Secretary—Mr. J. R. B. MASEFIELD.

5—Thursday, March 19th... ANNUAL MEETING ... ... Stoke.
Local Secretary—Mr. J. KIRKBY.

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1894	,,

GARNER MEDAL AWARDS.

1893.—The Rev. THOS. W. [illegible]TRY, M.A., F.L.S., F.E.S., for his Contributions to the Entomology of North Staffordshire.

1894.—CHARLES LYNAM, Esq., F.R.I.B.A., for his Papers and Memoirs on the Archæology of Staffordshire.

1895.—JOHN WARD, Esq., F.G.S., for research in, and papers on, the Geology and Palæontology of the North Staffordshire Coalfields.

The Treasurer in Account with the North Staffordshire Naturalists' Field Club and Archæological Society.

Statement of Account for the Year 1894.

Dr. Receipts.	£	s.	d.	Expenditure.	£	s.	d.
1893.				1894.			
31st Dec. To Balance in Bank	13	8	7	13th Mar. By Paid Expenses Hanley Evening Meeting	1	15	10
1894.				20th Apr. ,, ,, Burslem ,,	2	5	0
,, 8 Reports for 1893 @ 5/-	2	0	0	,, ,, Newcastle ,,	3	11	8
,, 396 Subscriptions @ 5/-	99	0	0	,, ,, Stoke Annual & Committee Meeting	5	14	6
,, 52 Entrance Fees @ 5/-	13	0	0	,, Cheque Book	0	2	6
,, Bank Interest	0	7	1	,, Bagguley for Printing Circulars, &c. ...	26	1	0
				21st Sept. ,, Subscription Palæontographical Society	1	1	0
				,, Vyse & Hill, Printing Annual Report...	36	3	0
				,, Collector's Commission and Postage ...	7	0	11
				,, Bank Commission	0	2	6
				,, Ex's. Summer Excursions, per Hon. Sec.	3	2	6
				,, Postages, per Treasurer	0	1	6
				31st Dec. ,, Balance in Bank	40	14	0
£127	15	11		Examined and found correct, March 5th, 1895. E. EARL.	£127	15	11

The Treasurer in Account with the "Garner Memorial Fund."

Dr.	£	s.	d.	Cr.	£	s.	d.
1893.				1894.			
July 1st. To Dividend on £50, Queensland 4% Stock	1	0	0	June 3rd. By Paid A. Fenwick for Medal awarded to C. Lynam, Esq., F.R.I.B.A. ...	0	19	6
1894.				,, Carriage of Do. and Postages per Treas.	0	2	6
Jan. 1st. ,, ,, ,, ,,	1	0	0				
July 1st. ,, ,, ,, ,,	1	0	0	,, Balance in Bank	2	18	0
1895.							
Jan. 1st. ,, ,, ,, ,,	1	0	0				
	£4	0	0	Examined and found correct, March 5th, 1895. E. EARL.	£4	0	0

ANNUAL REPORT.

REPORT.

Read at the Thirtieth Annual Meeting, held at Stoke, on Thursday, March 21st, 1895.

To-day the North Staffordshire Naturalists' Field Club and Archæological Society keeps its thirtieth anniversary. Three decades have passed since the historical meeting was held at the Old Infirmary at the instance of Mr. Spanton, which gave birth to the Club. Nine years ago the coming of age was duly commemorated, and some notice was taken when the first quarter of a century of its existence was completed. And now another epoch in the history of the Club has been reached, and the Council think that they may fairly take advantage of the opportunity and congratulate the members, that as in our own case at thirty years of age we have reached the full tide of mental and bodily vigour, so it must be with the Club, for this thirtieth year of its existence has given sufficient evidence of a matured energy and activity that in no other year have so many projects been broached with the view of extending the usefulness of the Club, which, whether they succeed or not, are at any rate a proof of the interest that is taken in its welfare and influence.

Thus the question of a Home has been brought before the Club, which has resulted in the partial and temporary tenancy of the New Gallery in Church Street, Stoke, which it is hoped will so recommend itself to members, that before the end of the term for which it has been now taken, means may be devised for securing a more lasting and more complete occupation.

Then again the Council are glad to note that there is a considerable stir going in the Sections, or at any rate some of them. Two or three have been debating how the Sectional System, which was

introduced in 1876, may be rendered more useful to the general body of the members, by holding meetings for papers and for discussion, by which a considerable amount of scientific knowledge may be disseminated through the Club. The possession of a convenient room makes such a scheme possible, as it has never hitherto been: a promising beginning has already been made by the Geological Section and the Council hope that the example so well set will in due course be followed by other Sections. Indeed, already steps are being taken by the Archæological and Photographic Sections to make a similar use of the new premises.

Still another proposition has been laid before the Council and discussed at the last General Meeting at Stone, viz.: whether it is practicable and desirable for members to give public lectures or instructions on Natural History &c., outside the Club in connection with the County Council. Nothing, however, has been settled at present: there is considerable difference of opinion of the propriety of such a course of action; and very possibly it may not be found advisable to attempt it. At the same time the energetic Chairman of the Zoological Section has already demonstrated in more than one place how such addresses may be given, and how gladly they have been welcomed.

The Zoological Section are also urging the County Council to take steps to put into force a short Act of Parliament which was passed last Session, in order to supplement the former more general Act passed 1880-1, by which the eggs of certain birds should be protected, as well as the birds themselves in the breeding season. The Section is also desirous that a certain number of additional birds should be scheduled in the general Act. These suggestions are, however, at the present time *sub judice:* still so far as they go, they belong to the transactions of the closing year.

The new Treasurer reports that the finances of the Club are in a prosperous state, and that the balance in hand at the beginning of the year has been trebled. This is so far satisfactory, but it must not be forgotten that if the Club is to have a room of its own, the unspent balance of the year will not be sufficient to maintain it.

ANNUAL ADDRESS.

By the PRESIDENT, WHEELTON HIND, M.D., F.R.C.S., F.G.S.

The last year has been a momentous one in the annals of our Club. At last after 28 years, definite steps have been taken to obtain a Home and the Committee have taken the New Gallery at Stoke-on-Trent for nine months on trial. Already the Geological and Archæological and Photographic Sections have held Meetings and arranged for a series of meetings for discussion.

This new departure is of the greatest possible importance not only to members of the Sections but to every member of the Club. A great deal more can now be done for those who wish to learn, and it is my great desire to see short educational courses established on the various subjects of which the Club takes cognisance. This will in turn make the excursions more enjoyable, more real, less like aimless pic-nics. A larger amount of interest will be taken in the scientific sides of these excursions, and it will be possible to prepare those who go, for what they are to observe, by preliminary meetings, when diagrams, sections and specimens can be shewn, and a short account given of the important facts to be noticed. Such an arrangement would, in the course of a few years, in itself furnish a tolerably liberal education in any one of our Sectional subjects For example, from a Geological point of view, the Club has in the last two years visited nearly the whole of the beds from the Wenlock Limestone to the Upper Chalk. True that some of the beds of the Oolite and the Permian have not been seen, but the Wenlock Limestones and Shales were seen, and the escarpments of the Amystry and Sudlow beds pointed out on Mr. Daniel's excursion in April, 1895. At the long excursion to Bath, the Old Red Sandstone was examined in the Mendips, together with the Carboniferous Limestone, which series has been more frequently visited, with the overlying Yoredale Shales and Millstone grit and Coal Measures in our own neighbourhood, and at Ballycastle and Murlough in the North of Ireland. At Cushendun last year the

fine old Red conglomerate was visited in the caves. Then missing the Permian, the beds of which formation I believe the Club have never visited, for the beds marked Permian in the Geological Survey maps of North Staffordshire are now shewn to belong to the upper coal measures. The Bunter and Keuper divisions of the New Red Sandstone are well known to us in our own district. The Rhætric beds were visited at Holwell, Somerset, and last year at Audlem, where the overlying White Lias representative also occurred. At Street, and in the Bottoms of Nunney and Vallis; Lias beds, and in the latter place the inferior Oolite was seen, the upper or coraline series of this formation having been examined on the previous day at Westbury Ironworks. At Bradford-on-Avon was seen the Great or Bath Oolite, Bradford clay and Cornbrash. The Gault, Greensand and Chalk were seen at the Westbury Escarpment, and revisited again this last year in Antrim, so that our Geological fieldwork as a Club has been varied and instructive. And looking through the Archæological work done, one cannot fail to have been struck with the large amount and variety of the places visited. Forts, camps, villages and towns, both British and Roman; Saxon, Norman, and all the later styles of architectural work, ecclesiastical, military and civil, have been well illustrated by first-class examples on our excursions. If these varied examples of Geology and Archæology were made the texts of some systematic teaching I feel sure that as a whole the Club would benefit immensely, a great deal more than it does by what has up to the present been considered as Sectional work, as illustrated by the Section reports of our annual volumes, or the reports of excursions, where the chief points noted seem to me to be methods of feeding and locomotion, with a few odd rhymes scattered broadcast through them.

I do hope that the tentative action of the Council in deciding to hire the New Gallery for nine months is only the beginning of a new era of more active work, work more widely participated in by the members of the Club, and of a higher scientific standard. At present I calculate that only about 12½ per cent. of the members in the Club do any work, but the attendance at Excursions and Meetings is higher, though I cannot get at figures owing to the hospitable character of the Club, which does not in any way limit the introduction of friends by its members, a somewhat shortsighted policy from a financial point of view. But it must not be forgotten that like all other

REPORT

OF

DR. ARLIDGE,

THE CLUB'S DELEGATE TO THE COMMITTEE OF THE CORRESPONDING SOCIETIES OF THE BRITISH ASSOCIATION AT THE OXFORD MEETING HELD IN 1894.

Having had the honour of being appointed the Delegate of the Club to the meetings of "The British Association for the advancement of Science," it is my duty to make a report of what took place at the meeting of the Corresponding Societies' Delegates at Oxford, in July last. The purpose of that and previous meetings is to bring local societies, like our own, into immediate touch with the great central Association by making known those scientific questions, towards the solution of which those corresponding societies can contribute. Moreover, by the gathering of Delegates, the several societies learn from each other what has been done, and also what schemes are contemplated to render their operations more useful and valuable.

The propositions placed before the last gathering resemble generally those suggested in previous years, but, as then they do not cover the whole domain of science cultivated by the parent Association. Moreover, as the range of subjects included in the objects of our own Club is even more limited, the suggestions to be placed before you are still fewer.

To proceed with those that concern ourselves, and following the authorized scheme of arrangement of Sections, we begin with Section A.

THE MATHEMATICAL AND PHYSICAL SCIENCES.

The former of these is outside the scope of our Club, but we claim a place as cultivators of physical research. In connection with this branch of science, your co-operation as workers is asked for in the direction of Meteorological Photography, to depict the fleeting

forms of clouds, of the lighting flash, of the passing phenomena of storms, whirlwinds and meteors, and in short, meteorological matters in general. Our photographic colleagues will now not be short of material for the exercise of their pleasing art, and when they have collected results, these may be forwarded to the Secretary of the Section, Mr. G. J. Symons. Another subject belonging to physical research is that of Earth Tremors, which would appear to be of constant occurrence. The same gentleman will receive observations made on this topic.

The next Section, C, deals with Geology, a science in which most of our members are greatly interested, and which has been cultivated with great success by several, among whom our learned president, Dr. Hind, occupies a foremost place. Our volumes of Transactions demonstrate much activity in the promotion of this branch of knowledge, and of its collateral subjects, Palæontology and Mineralogy. But what has been done in the past must be looked upon as only the earnest of what has to be accomplished in the future.

Once again I am able to show our photographers another direction for their enterprise. I referred to it in my *Compte rendu* two or three years ago; viz.: photographing geological sections and allied facts illustrative of geological disturbances. And I am pleased the suggestion was taken up and several geological incidents photographed. Still much more remains to be done. Then again, much has been effected by the Club in the science of Palæontology, especially by Dr. Hind, who has done good service in the description of those fossil Mollusca, which are met with in the rocks of this district. But other most interesting extinct forms of life call for your study. What can be done by an individual ardent in a pursuit, is exemplified by the brilliant researches of our colleague, Mr. Ward, in regard to the fossil fishes of the Coal measures. We want the like service done for the fossil plants, and Professor Blake asks for aid in the examination of the microzoa of clays, particularly of fossiliferous Jurassic clays. This is a subject of investigation when specimens are procurable, that can be carried on in the quiet of our own homes, without the cost and fatigue of travelling.

Other allied Geological topics recommended to our research are erosion of the coasts, cave exploration, the circulation of underground

waters, the position, structure and markings of erratic blocks, and the facts of mineralogy which throw light upon the sources and the direction followed by those ancient currents that have brought down to us the rocky debris constituting our clay, marls and gravels. The circulation of underground waters is to be examined by borings for mines and wells, and is a subject that was reported upon by a special Committee at the last Association meeting. Observations on Coast Erosion are denied to those of us who are fixed inhabitants of this Midland district, but our migratory members, in their seaside excursions, may add to the pleasure and interest of their wanderings by collecting facts relative to this subject.

We may now turn to Section D, which is devoted to Biology—including both Zoology and Botany, as well fossil as recent, in which subjects we are as naturalists particularly interested.

In connection with this Section, the Delegates at their first meeting introduced for discussion the subject of the formation, organization, management, and means of maintaining Museums in provincial towns, and the "Relations between Museums and County Councils." The conclusion reached was that these Councils can legally give grants in aid of Museums, and the following resolution was agreed to, viz.: "That in the opinion of this Conference it is desirable that local Natural History Societies, and those in charge of local Museums should place themselves in communication with the Technical Instruction Committee of the county or borough in which they are placed, with the view of obtaining pecuniary grants towards extending technical knowledge by means of lectures, or by Demonstrations in Museums."

The Zoological and Botanical papers read at the meetings of Section D were so numerous and multifarious as to make the quotation even of their titles impracticable in this report. But it will be gratifying to our members to learn that an active part has been taken by the British Association in extending legislative protection to wild birds and their eggs.

I may here add that the Botanists have secured for themselves a special Section, with its staff of officers, which will be in operation at the next meeting of the Association.

AN ORNITHOLOGICAL EXCURSION TO AQUALATE.

By ROBERT McALDOWIE.

[*Read February 19th, 1895.*]

In the month of June last year, Mr. Bladen, his sons and myself were kindly granted permission to wander where we pleased on Sir Thomas Boughey's estate, and we spent a very enjoyable day at what I may be excused in calling an ornithologist's paradise, namely, Aqualate Mere and its vicinity. The Mere and the surrounding woods teem with a variety of bird-life that is rarely found in one small district, and afford an opportunity of studying the domestic arrangements of more species of birds than are usually met with in one day's excursion. A few notes on what we saw and heard may interest those who are fond of our feathered friends.

We arrived at the gardens of Aqualate early in the forenoon, and were kindly met by the head gardener, himself a lover of birds, who took us to his office, where he had two canaries which sang beautifully the notes of the nightingale. In his store room above a pair of swallows had built their nest in the corner of an ordinary square wicker basket which hung upon a nail. We carried the basket to a window to make a closer inspection of the wonderful mud built of this African traveller, and could see the beautiful spotted eggs lying within on the warm feathers lining the nest. A few yards from the office door a robin had reared her brood in full view of any passer by. An exposed hole in the brick wall, just large enough to hold the nest, had sufficed for this bold intelligent bird, which is generally first among the feathered race to find out and trust the persons kindly disposed towards it. In one of his flower beds the gardener shewed us a beautiful picture, an ideal nesting place of one of our smallest migratory birds. This was a mass of white candytuft, and in the midst of the snowy blossoms a willow warbler had built her semi-domed mossy nest; through the entrance

we just caught a glimpse of the small red-spotted eggs within, lying on the soft warm feathers, and apparently soon to be hatched. The first peep of the young birds into the outer world must surely have delighted them, surrounded as they were by the choicest of flowers. The gardener then took us to a thick hedge to see a nest of the long-tailed tit; a very fine specimen of what is one of the handsomest examples of bird-architecture found in the world, and is said to take a fortnight to complete. It is oval in form, composed of moss with lichens on the outside, and lined with feathers, and has a small hole near the top for ingress. This one was empty, for the birds breed early in the year, and the young had been fledged in the month of April. A pied wagtail seemed very interested in our actions, and very tame, running about and picking up its food within a few yards of us. The gardener told us the pair had nested the last two years on the garden wall among the fruit trees, and reared a young cuckoo each time. As it was very probable the cuckoo had taken advantage of them this year again, we searched carefully for the nest to see if there might be an alien egg in it, but failed to find it. While searching we came on several nests with eggs of the thrush and blackbird, and one of the spotted fly-catcher, with eggs, placed on a fruit tree against the wall—a favourite site for the nest of this bird. The difference in size between this nest and that of the long-tailed tit is very remarkable. Though a larger bird than the tit, the nest of the fly-catcher is hardly one quarter the size of the tit's. This greatly aids it in escaping observation, for it is commonly placed in a very open situation, such as we saw later in the day, one built on the outside hinge of a boat-house door, and containing eggs. A keeper told us the pair had built there for several years: a habit this bird has of nesting always in the same spot. The gardener then told us an interesting tale of usurpation and eviction that occurred early in the year. A deep split between two branches of an old fir tree had been the chosen nesting place of a pair of starlings for several seasons, and they had begun housekeeping, as usual, this spring, when a pair of wandering, homeless, great spotted woodpeckers happened to visit the tree, and came on this snug retreat and took a fancy to it. It would do capitally for rearing their young, and save them the trouble and labour of digging out a house for themselves. Forthwith began a noisy siege of the hole, the screaming and hissing attracting the attention of the gardeners to them. The row went on for two days,

NOTES ON BIRD LIFE DURING THE SEVERE WEATHER OF JANUARY AND FEBRUARY, 1895.

By ALEXANDER M. McALDOWIE, M.D. F.R.S., Edin.

[*Read February 19th, 1895.*]

"A winter such as when birds die."—*Shelley.*

I feel that some apology is due to the members of the Field Club for the fragmentary character of this communication, which consists merely of jottings made whilst pursuing my ordinary work during the present severe weather. I have been unable to make any purely ornithological excursions or systematic study of bird life, and my observations refer only to the immediate neighbourhood of Stoke and to Trentham. The area, however, is fairly typical of North Staffordshire, as it embraces both urban and rural districts.

During the mild weather at the close of 1894 large flocks of lapwings, rooks and starlings frequented the meadows and fields. I saw no lapwings after the frost began, this species being remarkably sensitive to cold. Before severe weather peewits always depart, usually some days in advance. The flocks of rooks and starlings broke up when the severe weather firmly set in, and the birds foraged singly or in small parties, along with the small birds, in farm-yards, gardens, and along the highways. Their numbers diminished considerably, and I am of opinion that many of them followed the lapwings to the coast. During the great frost of 1890 most of our birds departed for the south coast and the south of Ireland. When the frost broke up Mr. Whitlock observed a flock of starlings on their return along the Trent valley, and states that their number could only be reckoned by the ten thousand. I saw no song thrushes after the first few days of frost. This is in accordance with previous observations in this locality during great frosts. The reports from various districts throughout Staffordshire during the severe winters of 1879-80 and

1880-81 stated that thrushes were seldom or never seen. Larks and redwings also disappeared, and all other species of small birds except sparrows, either left the district, or remained in greatly reduced numbers. As examples of this extreme diminution of avian life, I may state that on February 14th, I counted the number of birds visible as I drove from Stoke to Trentham, about three o'clock in the afternoon. The sun was shining at the time, but there was a cold east wind. I only saw eight sparrows feeding at various points on the road, two others flew overhead, five rooks were foraging amongst some sheep in a field, and one robin perched on a wall. On the 16th—also a bright day—between eleven and twelve o'clock, I drove about three miles along a lane noted for birds. I saw two hedge accentors, two blackbirds, one rook, and about a score of sparrows.

"We hear the beat
Of their pinions fleet,
As from the land of snow and sleet
They seek a southern lea."

Nothing interferes with the economy of bird life so much as a long continued frost. After the first week our feathered residents appeared sorely pressed for food, deserted their accustomed haunts, and became exceedingly tame and confiding. Fieldfares, redwings, (at first), blackbirds, missel-thrushes, rooks, starlings, chaffinches, wagtails, hedgesparrows, wrens, tits, etc., came quite into town, and picked up a living with the sparrows and robins, in the streets and gardens, door-steps and window ledges. I am pleased to say that their appeal for help was not in vain, for many people fed them regularly. In rural districts they crowded round the farmsteads: the sheep troughs and feeding places were the only spots in the open fields which were frequented. They also congregated along highways, and I noticed all the species I have just enumerated on our most frequented roads. For upwards of a week a beautiful storm-cock located himself on a particular bush in the hedgerow at Oakhill, taking no notice of the numerous vehicles and foot-passengers who passed within a few feet of his perch.

"Of various plume and chirp the shiv'ring birds
Alight on hedge or bush."

A very noticeable feature was the deep silence which reigned

SUMMARY OF LITERATURE RELATING TO THE GEOLOGY, MINERALOGY, AND PALÆONTOLOGY OF NORTH STAFFORDSHIRE.

COMPILED BY J. WARD, F.G.S.

[CONTINUED FROM REPORT FOR 1893-94.]

1892.

Barke, F. Gypsum Mines at Fauld—*Trans. N. Staffs. Nat. Field Club. Report for 1891-2.*

1893.

Beasley, H. C. The Trias of Cheadle and Alton, Staffordshire.—*Liverpool Geological Association. Journal, Vol. xii, Session 1891-2.*

Beasley, H. C. The Bunter Conglomerate near Cheadle, Staffs.—*Ibid. Vol. vi, p. 439.*

Hind, W. Additions to the Palæontology of North Staffordshire.—*N. Staffs. Nat. Field Club. Report for 1893-4, p. 107.*

Hind, W. Additions to the Palæontology of North Staffordshire.—*Ibid. Report for 1893-4, Vol. xxvii, p. 108.*

Kendall, J. D. The Iron Ores of Great Britain and Ireland.—London 1893.

Reade, T. M. The Trias of Cannock Chase.—*Liverpool Geological Society. Proceedings, Vol. vi. (1892,) p. 418.*

Ward, J. The Progress of Geological and Palæontological Research in North Staffordshire, with summary of Literature relating to the Mineralogy, Geology, and Palæontology of N. Staffs.—*Proc. N. Staffs. Nat. Field Club. Report for 1893-4.*

1894.

Andrews, C. W. Notes on a specimen of *Keraterpetum Galvani*, from Staffordshire. Geol. Mag. Vol. II. Decade IV. p. 81.

Baake, F. Notes on Sections in the Drift in N. Staffordshire and S. W. Derbyshire.—*Proc. N. Staffs. Nat. Field Club. Vol. xxviii. 1894.*

Bonney, T. G. A comparison of the Pebbles in the Trias of Budleigh, Salterton, and of Cannock Chase.—*Brit. Association, Report 1894, p. 655, also Geol. Mag. Vol. II, Decade iv, p. 75.*

Davis, J. W. On the Fossil Fish—Remains of the Coal-measures of the British Islands. Part II.—*Acanthodidæ.* (Descriptive of specimens from North Staffs.)—*Trans. Roy. Dublin Society.* Vol V. (Series II.) p. 249, pls. xxvii., xxviii., xxix.

Hind, W. A Monograph on *Carbonicola, Anthracomya & Naiadites*, Part I. *Carbonicola (Anthracosia).* Palæont. Soc. Vol. for 1894.

Kirkby, J. On the Trap Dykes in the Hanchurch Hills. Trans. N. Staffs. Field Club. Vol. xxviii (1894,) p 131.

Traquair, R. H. On Palæoniscoid Fishes (Description of two new species of fossil fishes from the Coal-measures of North Staffs.)—*Ann. & Mag. Nat. Hist., Ser. 6, Vol. xiv, p. 372-3, pl. ix. figs 7-9.*

Watts, W. W. On a Keuper Sandstone cemented by Barium Sulphate, from the Peakstones Rock, Alton, Staffs.—*Ibid, p. 665.*

1895.

The North Staffordshire Coal-field. *Colliery Guardian, Vol. lxix, (1895). p. 641, 687, 786, 848, 887, 979.*

ON GLACIAL THEORIES, PAST & PRESENT,

AND THEIR

APPLICATION TO STAFFORDSHIRE.

By CHAS. E. DE RANCE, Assoc. Inst: C.E., F.G.S., F.R.G.S., F.R.Met.Soc. Of H.M. Geological Survey.

[*Read January 22nd, 1895.*]

Two sentences used in a Geological debate, by my old chief, the late Sir Andrew Ramsay, have lingered in my memory. Speaking against the views of a speaker said, "he has forgotten more than he ever knew," and added "all that he has told us that is true is not new, and I fear all that is new is not true." This criticism, applied to an individual, is often equally applicable to groups of individuals forming 'schools of thought,' and the history of Glaciology, is a remarkable example of that fact. A very recent work, published indeed only last month, "The Annals of British Geology 1893," by my friend the Revd. Professor Blake, M.A., tells us that "another new periodical has started during the year devoted to Glacial Geology, called 'The Glacialists' Magazine.' It is the organ of the Glacialists' Association, and is edited by its Secretary Mr. W. F. Kendall. Its supporters belong to what is called the New School in that subject, but its contributors are sought from amongst the supporters of both schools, the object being to give a fair meaning to all sides." In this statement, I believe there is given a very true and just view of the objects of the Glacialists' Association, who number in their ranks nearly every member of the Geological Section of the North Staffordshire Field Naturalists' Society, if for "New School" we read "old," and *vice versâ*. This I trust to establish in the course of the following address.

In the "Illustrations of the Huttonian Theory" in 1802, Professor Playfair pointed out that glaciers had been the means of carrying

erratic blocks, and 1806 he further inferred that those on the Jura had been thence transported from the Alps from an ancient extension of the glaciers now existing in that range of mountains, and in 1816 he stated that no power could have transported the great angular erratics of Switzerland, but glaciers which formerly extended far down its valleys. On the Continent this view was adopted by M. Venetz in 1821 (Bibliothèque Universelle de Geneve, tom. xxi., p. 77, and further in 1832 (Denkschriften der Schweizerischen Gesellschaft, 1 Band Zurich), by M. de Charpentier in 1835, "Notice sur le cause probable du Transport des block erratiques de la Suisse," (Annales des Mines 3 me Series, tom. vol. viii.), and in 1841, in his "Essai sur les Glaciers, et sur le Terrain Erratique de Bassin du Rhone" (Lausanne).

In 1828 Mr Charles Maclaren in the *Scotsman* described the glaciation of boulders *in situ* occurring in the railway cuttings near Edinburgh. "In examining some of the blocks of larger size" he says "we find the *upper surface* and two of the sides finely dressed, while the lower surface and the two ends are either much less dressed, or actually rough and angular. It is remarkable that in such stones, though lying at a distance from each other, we find the direction of these fine groovings, which constitute dressing generally to correspond, and to point in a direction E. and W. . . . Some of the larger blocks are polished on the upper and not on the under side. This evidently shows that the clay did not close round them at once, and that after the part below was firm, the current above bearing other clay and stones with it, was still in motion." This current the author ascribed to water.

The important generalizations of Playfair first received the powerful support of Agassiz in 1837, in an address before the Helvetic Society of Natural Sciences, at Neufchatel, and his more extended researches "Etudes sur les Glaciers" in 1840, in which year he visited the British Isles, to which he extended his views, and gave a summary of his results to the Geological Society of London; showing distinct centres of dispersion of erratic blocks, by glacier ice in the Ben Nevis area of Northern Scotland, the Grampians and Ayrshire in Southern Scotland, and the hills of Northumberland and the mountains of Westmoreland, Cumberland, Wales, and Antrim, Wicklow, and the West of Ireland, each district he pointed out has its peculiar débris, hence it is plain, "that the cause of transport must be sought for in the centre of the mountain ranges and not from a point without the

On the OCCURRENCE of MARINE FOSSILS IN THE COAL-MEASURES OF NORTH STAFFORDSHIRE.

By JOHN WARD, F.G.S.

[*Read before the Geological Section, April 24th, 1895*].

Notwithstanding that many interesting and valuable papers bearing upon the Geological features of the Coal-fields of North Staffordshire and their associated fossil fauna and flora have at various times been brought before the Society, no one of them has been specially devoted to the marine beds which occur throughout the above-named Coal-fields.

In two previous communications to this and a kindred Society,* I have incidently called attention to the occurrence of marine fossils in the Coal-fields in question, and pointed out the special interest attached to such remains, and their value to the Geologist in the elucidation of questions concerning the circumstances which attended the accumulation of coal.

As supplementary to my previous contributions, I have pleasure on the present occasion of recording the discovery of a new horizon yielding at least one genus and species of marine fossils.

Before entering upon a description of the bed in question—which is the principal object of this paper—it may not be out of place, perhaps, for me to give a connected outline of what is yet known concerning the other marine beds of North Staffordshire and their included fauna.

I propose to notice;—first, in their ascending order of position, the various marine horizons developed in the Churnet Valley; secondly, I shall make such general observations respecting the

*Addresses and Papers, N. Staffs. Nat. Field Club, Hanley, 1875.
Trans. N. Staffs. Inst. Mining and Mechanical Eng. Vol. x, p. 29.

Palæontology of these zones as will better illustrate their Palæontological features; and, thirdly, some general remarks on the first appearance of certain groups of fossils.

THE LOWER COAL-MEASURES OF THE CHURNET VALLEY.

The Lower Measures of the Churnet Valley consist of a series of alternating marine and estuarine strata. The total thickness of these measures has not been ascertained, they cannot be less than several hundred feet in thickness. In this series marine beds attain a greater development, and fossils of marine types are more abundant than in any other locality in North Staffordshire.

At the base of the series occurs the well-known bed of Hæmatite known as the Froghall Ironstone, which lies at a short distance above the Rough Rock. In connection with the Froghall Ironstone, I may, in the first place, point out the great interest which attaches to it inasmuch as immediately overlying the ore we meet with the first traces of organic-remains in the Lower Coal-measures of this district. These remains consist principally of bivalve-shells of the genus *Carbonicola (Anthracosia* of King) which, together with its congeners, is usually held to have been of estuarine or fresh-water habitat.

I may here remark that this group of Mollusca was not only rich in individual forms but in number of species, and, during the Coal-period, had a considerable vertical range in North Staffordshire.

It is of still further interest to note that the late M. Molyneux, F.G.S., found the remains of a rare crustacean *(Anthrapalæmon (Prosarti)* in this horizon.

We have thus distinctive evidence that at the base of the series beds of estuarine or fresh-water origin occur; these, however, are succeeded by deposits in which we meet with a still further increase in the life of the Lower Coal-Measure series, consisting of types showing conclusively that marine conditions greatly predominated at this period.

At a distance varying from twenty to forty yards above the ironstone comes a seam of coal called the "Stinking Coal," about 3 feet in thickness, and at about the same distance above the latter, a second seam of coal called the "Sweet Coal."

SECTION G.—ARCHÆOLOGY.

CHAIRMAN.—MR LYNAM.

(Report 1894-95).

As this is the 30th year of the existence of our Society it has occurred to me that a short outline in review of the work of the Archæological Section might be acceptable to the present members of the Society.

When first established it would seem that the idea was that the appointment of President should be a permanent one, for the first in that office—Mr Bateman, of Biddulph—held it for 4 years, from 1865 to 1869. In 1869 the appointment became an annual one. Mr Bateman still survived, but he changed his residence to our part of the country early in the career of our Society. So though an active and learned member whilst with us he has not of late years contributed to the work of the Society. It is a happy thought that of the 19 gentlemen who have served the distinguished office of President 16 are still amongst us, and all save one (Mr Yates) continue, not only to be attached to the Society, but remain active and energetic members. By them and a few others in fact the real usefulness of the Society is mostly maintained, but happily at the present time there are younger members of more recent connection in whom the continued success of the Society may be regarded as insured for many years to come, and it is not too much to hope that the able pursuit by this Club of Natural History and Archæology will in the long future remain as a School of Science, as it has been in the past.

The establishment of a medal in memory of the 2nd President (Mr Garner) as a distinction to those who think it worth while to do their utmost for the Society in its practical work, and who believe in its operations as sources of intellectual exercise and enjoyment, should be an incentive to younger members to at least consider whether the objects of the Society are not worth pursuing. As one who has realised untold gain from edging in the recollection of the

duties of membership in the midst of business calls not a few, and as one to whom the unmerited honour of distinction has been bestowed I sincerely plead with the younger ones amongst us never to forget their membership of the North Staffordshire Naturalists' Field Club and Archæological Society.

From the Annual Reports Mrs Lynam has prepared a list of all the places and subjects visited by the Society from its commencement, and of the Presidents in their turn of office. It would of course be tedious to go through these lists in this report, but it may be they would make a useful index and perhaps the following attempt at a short summary may not be unwelcome.

PRE-HISTORIC REMAINS visited in the county of Stafford: Bride Stones, Cromlech on The Roaches, Gorton Stone, Barrow on Cauldon Lowe.

IN THE ISLE OF MAN.—The circle of graves known as Mule Hill, The British Village near to Glastonbury.

IN IRELAND.—The Chambered Tumuli of New Grange and Dowth, The Cromlech and circle near to Belfast.

IN DERBYSHIRE.—Arbor Lowe, Stanton Moor.

CAMPS OF BRITISH FORT in the county of Stafford.—Alton, Berth Hill, Bury Bank, Billington, Castle Ring. Also Bury Walls near to Hawkstone, White Horse Hill.

ROMAN CAMPS.—Chesterton, Congleton, Barrow Hill or Rocester, Mancetter, the Roman City of Wroxeter and Villa at Chedworth, and the great Roman wall in the north.

SAXON WALLS.—The Chancel at Repton and the Chapels at Hexham and Ripon Cathedrals, and the Church at Bradford on Avon.

CATHEDRALS.—Lichfield, Chester, Hereford, Southwell, Carlisle, Wells.

ANCIENT CROSSES.—Sandbach, Leek, Checkley, Wolverhampton, Chebsey, Ilam, and many in the Isle-of-Man—Bewcastle.

MANSIONS AND MANOR HOUSES.—Brereton, Hardwick, Throwley, South Wingfield, Wootton, Pillaton, Tapley, Moreton, Haddon, Bramhall, Montgomery, and many others.

JOURNAL OF PROCEEDINGS.

EXCURSIONS.

I.—DUDLEY.

THURSDAY, April 19th.

LEADER.—DR. HIND.

The first excursion of the season took place under the leadership of the president, assisted by Mr W. Madeley, secretary of the Dudley and Midland Geological Society. A party consisting of upwards of 50 members and friends alighted at Tipton Station where vehicles were in readiness to convey them to the Foxyard openwork. Here an opportunity was afforded of seeing the seam of the South Staffordshire thick coal exposed in the open. The visitors found the men in the act of clearing away the *débris* on the top of the seam in order to reach the lower part of the coal which hitherto was left untouched, owing to the imperfect pumping arrangements. Latterly, however, the water has all been drawn away, and at the time of the club's visit the "heathen" coal, the seam below the thick coal, was being worked, sections of the Gubbin iron stone being laid bare. In the middle of the section a splendid example of a geological fault, with a throw of seven yards upwards, was to be observed, showing the ironstone thrown up against the thick coal, which at the line of the fault presented a beautiful slicken-sided appearance. About a yard to the left of the fault it was noticed that the beds were much bent in a downward direction, having evidently been subjected to great pressure. Those in search of fossils were rewarded by the discovery of numerous shells and plant remains in the Gubbin beds. The party continued the drive to the Wren's Nest, picturesquely situated on the north side of the town, and remarkable for its elevated elliptical dome formation as well as for the extent of the mining operations in the Wenlock limestone strata. Mr Madeley briefly explained the geological position of the limestone rocks, pointing out that they had been tilted up by a great sectional earth movement, the result of which was that the thick coal forming part of the other coal measures which had been deposited on the surface of the limestone, had entirely disappeared, probably through denudation. The carboniferous limestone and the Yoredale beds, as well as Millstone Grit, were absent from and probably had never been deposited in that district. The Coal Measures, which were about three thousand feet thick, were deposited on the denuded surface of the limestone. The slow earth movement indicated by the faulting was one of the last great geological changes that occurred in that district, and took place subsequent

to the eruption of the basalt which formed the Rowley Hills. Mr Madeley added that the shales and limestones were very prolific in fossils—viz., corals, crinoids, trilobites, and molluscs. After a sojourn of about half an hour in this interesting locality, the party next drove to the museum of the Dudley Geological Society, passing *en route* the Priory which was founded by Gervase Paganel, Lord of Dudley, in pursuance of the intention of his father Ralph to found at this spot a convent of Benedictine monks in the middle of the 12th century. Some of the excursionists alighted to inspect the ruins, whilst the majority proceeded direct to the museum, where a pleasant time was spent in examining the fine collection of local Silurian fossils and coal deposits. Dudley Castle was next visited, and a brief historical sketch of this famous structure was given by Mr Madeley, who was heartily applauded for the interesting information which he volunteered concerning it. Several members of the party shared in an expression of regret that the archæological features in the interior of the Castle were being in some measure adapted to meet the modern requirements of an up-to-date fête and gala. Upon leaving the precincts of the Castle, the company adjourned to the Saracen's Head, where they enjoyed a substantial repast. The election of 11 and nomination of 10 new members followed, and hearty votes of thanks were passed to Dr. Hind and Mr Madeley. The weather, which in the morning had been dull and threatening, cleared up towards noon, and the remainder of the day was beautifully fine.

II.—BURTON-ON-TRENT AND ROLLESTON.

SATURDAY, May 19th.

LEADER—MR. WILLIS BLADEN.

Forty-two members left Stoke by the 11-45 train for Burton-on-Trent. The day was bright but very cold. The party proceeded in carriages to Trent House, the residence of Dr. Mason, where they were joined by about 20 members of the Burton Field Club, with Mr. Jas. G. Wells as leader. Dr. Mason received them, and they were at once conducted to his museum, where an hour was but too short a time to get even a glimpse of his treasures. The extent of Dr. Mason's work in collecting objects of natural science may be in some degree gathered from the following list of his collections:—British mammals, birds, birds' eggs, reptiles, mollusca, insects, Rye's collection of coleoptera, F. Smith's aculeate hymenoptera, J. Scott's hemiptera, crustacea, echinodermata, polyzoa (recent and fossil), hydrozoa, (recent and fossil), phanerogamia, filices, musci, hepaticæ, algæ, lichens, fungi, diatomaciæ. There is also a full set of the glass models, made by Bloscka, which illustrate British natural history. All too soon the party had to leave, but before doing so, the Rev. T. W. Daltry proposed, and Mr. J. R. B. Masefield seconded a very hearty vote of thanks to Dr. Mason for throwing open what was described as perhaps the best private natural history museum in the kingdom. Regrets were expressed that in consequence of domestic affliction Dr. Mason was unable to accompany the party further. The united clubs then drove to Rolleston Hall, the

EVENING MEETINGS.

I.—NEWCASTLE.

TUESDAY, November 20th.

The first evening meeting of the season took place in the Council Chamber of the Municipal Buildings, Newcastle. There was a good attendance. The objects brought together for the inspection of the members comprised a miscellaneous collection by Mr W. H. Earl, the local secretary, who showed a very extensive assortment of stamps, envelopes, and postcards, of both home and foreign origin, many of the specimens being rare and valuable; a fine collection of old and modern coins, South African native ornaments and weapons, and some old newspapers and books. Mr R. Fenton exhibited several articles of interest, including the original chartulary of Dieu la Cres Abbey, Leek. A live grass-snake was shown by Mr A. Meigh.

Dr. R. H. Read, of Hanley, furnished a large and handsome collection of stuffed birds and bird skins, which were of practical utility in illustrating a paper which he read on "The Nature, Uses, and Distribution of the Colours of Birds, with an Outline of the Bearing of the Theory of Evolution upon their History." Dr. Hind (president) having taken the chair, two members nominated at the last meeting were elected and five new nominations were received. Dr. Read then read his paper. The President complimented Dr. Read on the attractive manner in which he had presented them with much valuable scientific matter. Mr J. R. B. Masefield proposed a vote of thanks to Dr. Read, which was seconded by Mr Wells Bladen and supported by the Rev. T. W. Dalby (secretary), all of whom testified to the ability displayed in the treatment of the subject. The vote was cordially approved of, and was acknowledged by Dr. Read.

II.—STOKE.

TUESDAY, January 22nd.

The second evening meeting of the winter session was held at the North Stafford Hotel, Stoke. The President (Dr. Hind) presided, and there was a large attendance. After the election of five new members, Mr J. R. B. Masefield moved the following resolution:—"That a committee of the club be appointed to meet a deputation of the Staffordshire County Council to consider as to technical lectures on natural science by members of the club, and also to confer as to the Wild Birds' Protection Act, 1894." Mr Masefield said the President had kindly allowed him to bring forward the resolution though owing to the amount of business on the agenda he should not be able to go into the merits of the case. Briefly, his reason

for proposing the resolution was that many members had mentioned to him the desirableness of the club acting in some way with the County Council on the subject of technical education in relation to natural science. He had been in correspondence with Mr Thomas Turner, Director of Technical Education to the County Council, who had brought the matter before the Technical Instruction Committee, and that committee had agreed to appoint a deputation to meet a committee appointed by the club. The suggestion was that members of their club should voluntarily undertake to give lectures on various subjects of natural science, so as to spread knowledge on these subjects through the towns and villages of North Staffordshire, and it was proposed that the County Council should arrange the centres and make provision for rooms and other incidental expenses. He was quite sure there would be no lack of lecturers. With regard to the second subject mentioned in the resolution, as they were aware an Act was passed last year for the further protection of wild birds and their eggs. The subject was a long one, but it must at any rate be admitted that their rarer wild birds were diminishing, and required further protection at the hands of the County Council. In seconding the resolution, Mr F. Barke said although it would not be right for a committee to pledge the club on a matter of such importance as that of science lectures, he saw no reason why a committee should not be appointed to meet a deputation from the County Council and discuss the subjects named. Mr J. Wilcox Edge said although the matter relating to technical instruction might well be considered by the Technical Instruction Committee of the County Council, the other subject would have to go direct to the General Purposes Committee. At a meeting of the Technical Instruction Committee held at Stafford the other day, a desire was manifested to meet the club by providing rooms and other requisites for the lectures, which was quite within the scope of the committee. The resolution was carried unanimously, and a small committee was appointed. Mr Masefield will be glad to hear from members of the club opinions as to the diminution or otherwise of wild birds.

Mr T. S. Wilkins said it would be within the knowledge of many of the members of the club that the President had completed the first part of what was really a great work—viz., "A Monograph on Carbonicola Anthracomya and Naiadites." The work reflected infinite credit upon the President, and he moved that the congratulations of this meeting be accorded to Dr. Hind upon the completion of the first part of his monograph. Mr C. E. DeRance seconded the resolution, which was carried. The President, in acknowledging the compliment, said the preparation of the work had been a great pleasure to him during the past three years, and the publication of the first part of it was a great satisfaction to him.

The next business on the agenda was a paper on "Glacial Theories, Past and Present," by Mr C. E. DeRance, Assoc. Inst. C.E., F.G.S., F.R.G.S., F.R.Met.Soc.. Before dealing with his paper, Mr DeRance called attention to a hammer-head formed of Lickey-quartzite, which, he explained, had been found by Mr Brierley at the foot of the Hanchurch Hills. He then read his paper on Glacial Theories. Mr T. Wardle proposed a hearty vote of thanks to Mr DeRance for his able and instructive lecture, which he said was immensely interesting to all who made a study of the antiquity of the human race. Mr Blaikie seconded the vote, and expressed a hope that Mr DeRance might be induced to read another paper on the subject. In supporting the motion, Mr

LIST OF MEMBERS.

CORRECTED TO AUGUST 28TH, 1895.

TOTAL NUMBER, 414.

HONORARY MEMBERS.

Dunedin, Right Rev. the Bishop of, D.D., Otago, N.Z.

Bonney, Rev. Canon Professor T.G., D. Sc., L.L.D., F.R.S., F.G.S., 23 Denning Road, Hampstead, N.W.

Wragge, Clement L., F.R.G.S., F.R. Met. S., Torrens Observatory, Adelaide, South Australia.

Yates, James, M.R.C.S., 171 Aston Lane, Perry Barr, Birmingham.

ORDINARY MEMBERS.

Acton, John, Ivy Bank, Stoke

Adams, Frank, High Street, Stoke

Adler, Magnus, 8 St. John's St., Hanley

Alcock, John, M.R.C.S., Portland House, Burslem

Alcock, S. King, M.D., Portland House, Burslem

Allan, Mrs McArthur, Island House, Longton

Allen, Thomas, 40 Lichfield St., Hanley

Allen, W.S.
Allen, Mrs
Allen, Wm., M.P. } Woodhead Hall, Cheadle.

Ann, G. F., Grovenor Gardens, Newcastle

Arlidge, J. T., M.A., M.D., Lond., The High Grove, Stoke, *Vice-President*

Armstrong, A. A., M.A., Denstone College, Uttoxeter

Asbury, Mrs., North End House, Uttoxeter

Ash, Frederic, Stoke Ville, Stoke

Ash, Mrs

Ash, F. W., The Villas, Stoke

Ashcroft, S., Stanley Terrace, Dresden

Astbury, G. S., Eccleshall

Atkinson, W. N., H.M. Inspector of Mines, Newcastle

Audley, Jas. A., B. Sc., A.R.C. Sc., F.I.C., F.C.S., 97 Lichfield St., Hanley

Austin, Miss L., Heathcote House, Longton

Bagguley, G. T., Newcastle

Bagguley, John, High St., Newcastle

Bailey, J. C., Bradwell Lodge, Porthill

Baines, A., Lichfield Street, Hanley

Baker, J., 47 Soho Hill, Birmingham

Baker, Miss Ellen, Endon Hall, Endon

Bakewell, A. E., Station Square, Longton

Bamber, W. H., Hill Street, Stoke

Bamford, Ch. R., M.R.C.S., L.R.C.P. (London), Woodleigh House, Uttoxeter

Bamford, Henry, St. Mary's Mount, Uttoxeter

Bamford, S. B., Hawthornden Manor, Uttoxeter

Barber, E. H., Fishergate Hill, Preston

Barke, F., F.G.S., Penton Villa, Stoke, *Vice-President*

Barke, Mrs
Barker, Miss Mary E., The Villas, Stoke
Barnwell, Rev. C. F. L., M.A., Stramshall Vicarage, Uttoxeter
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Beach, F., National Provincial Bank, Stone
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