

ADDRESS TO THE MEMBERS OF THE TYNESIDE  
NATURALISTS' FIELD CLUB,

READ BY THE PRESIDENT, THE REV. HENRY BAKER TRISTRAM,  
M.A., F.L.S., C.M.Z.S., MASTER OF GREATHAM HOSPITAL, AT THE  
FOURTEENTH ANNIVERSARY MEETING, HELD IN NEWCASTLE-UPON-  
TYNE, THURSDAY, MARCH 29, 1860.

GENTLEMEN—The duties which devolve upon the President of the TYNESIDE FIELD CLUB are such that the reminiscences of a year of honourable office can be alloyed by only one regretful pang—that caused by the consciousness of deficiencies and shortcomings during the occupancy of the chair.

And first among my duties in retiring before a worthier successor, I have to express to the members of the Club my deep sense of the honour they have conferred upon me—an honour more prized by the naturalist than rank or academic distinction; and also my gratitude for the gallant manner in which they have proved themselves worthy scions of their border forefathers, and daunted neither by distance nor weather, have responded to every call, and joined in every foray, have ransacked the recesses of the marches, and levied black mail from the sea; and, finally, have returned from each peaceful raid with a rich booty of specimens, health, and knowledge. But as no prudent general will overtax the strength of his troops at the commencement of a campaign, so my invaluable and indispensable aide-de-camp, your secretary, reconnoitered only for an expedition to Ovingham wherewith to open the season, and there, on the 31st May, we held our FIRST FIELD MEETING. The members alighted at Stocksfield station, and visited the remains of Bywell Castle, and the twin churches of Bywell, St. Andrew's, and St. Peter's. Both these churches, as well as that of Ovingham, contain Saxon traces, and probably there is no other locality in England where, within a morning's walk, three ecclesiastical edifices could be visited, stamped with the impress of the Anglo-Norman architecture. The tower of St. Andrew's, with its contracted

round-headed windows and heavy mullions, probably knew the days when the Saxon Tyson was yet Earl of Northumberland, long before the barony of Bywell had fallen into the lap of Guy Balliol for good and faithful service to William Rufus. The Scottish arms may yet be seen in St. Peter's, recently most carefully and beautifully restored under the auspices of the Vicar, the Rev. B. E. Dwarris. To account for these two churches in close proximity, a story was told of two unloving sisters, co-heiresses, who, not agreeing on the joint design, built each her own, side by side. But if it be the President's office to lead the members in the search for truth, he fears he must dispel the romantic myth by the prosaic remark, that two orders of monks had adjoining manors, and built their churches side by side, for the sake of society for their exiled chaplains.

From Bywell we proceeded to the Whittle Dean Reservoir, where we saw more of art than of nature, and there visited Nafferton Castle, constructed out of the stones of the neighbouring Roman Wall, by Philip de Ulecote, formerly constable of Chinon, in Touraine, and Sheriff of Northumberland in 1213. The erection excited the indignation of Richard de Umfraville, of the Castle of Prudhoe, who obtained an order from the crown commanding the square stones to be taken to Bambro', and the rubbish to Newcastle. After descending Whittle Dean, and botanising by the way, Ovingham church and churchyard were visited, a spot hallowed to every member of the Tyneside as the burial place of Thomas Bewick, and of which a beautiful engraving decorates the fourth volume of our "Transactions." Twenty-three members sat down to dinner, including our venerable patriarch, Mr. John Thompson, who, in his 81st year, had walked and botanised for a dozen miles. Mr. Wailes exhibited a large capture of the rare *Coleopter*, *Clytra quadripunctata*, an insect which had not been taken for forty years in England, and many interesting plants collected during the day were exhibited, among them Bird's Eye Primrose (*Primula farinosa*), Herb Paris (*Paris quadrifolia*), *Arenaria verna*, *Geum intermedium*, *Geranium sylvaticum*, Butterwort (*Pinguicula vulgaris*), Globe Flower (*Trollius Europæus*), &c. All who were present on this occasion

must remember the Rev. J. F. Bigge's most interesting discourse on the folk lore connected with Nafferton Castle. Associated with the grey walls of the presuming Philip, is a Border ballad, now equally broken and ragged, and also, a popular tradition. Through the treachery (it is said) of a serving maid, named "Orange" in the ballad, "Long Lonkin," a noted freebooter, gained admission, and murdered "the lady of the hall," whom he dragged into the dene, and threw into a deep pool in the burn—which may be seen to this day, in confirmation of the story, under the name of "Long Lonkin's Hole." So much of the ballad as she could recollect was taken down from the lips of an old woman at Ovington, many years ago, and committed to print in Richardson's "Table Book" (Legendary Division, vol. iii.):—

The lord said to his ladie, as he mounted his horse,  
Beware of Long Lonkin, that lies in the moss;  
The lord said to his ladie, as he rode away,  
Beware of Long Lonkin, that lies in the clay.

What care I for Lonkin, or any of his gang?  
My doors are all shut, and my windows penn'd in.  
There were six little windows, and they were all shut;  
But one little window, and that was forgot.  
\* \* \* \* \*

And at that little window Long Lonkin crept in.

Where's the lord of the hall? says the Lonkin:  
He's gone up to London, says Orange to him.  
Where's the men of the hall? says the Lonkin:  
They're at the field ploughing, says Orange to him.

Where's the ladies of the hall? says the Lonkin:  
They're up in their chambers, says Orange to him.  
How shall we get them down? says the Lonkin:  
Prick the babe in the cradle, says Orange to him.

Rock well my cradle, and "bee ba" my son:  
You shall have a new gown when the lord he comes home.  
Still she did prick it, and "bee ba" she cried;  
Come down, dearest mistress, and still your own child.

Oh! still my child, Orange; still him with a bell,  
I can't still him, ladie, till you come yoursel'.  
\* \* \* \* \*

Hold the gold basin, for your heart's blood to run.

To hold the gold basin, it grieves me full sore:

Oh kill me, dear Lonkin, and let my mother go.

\* \* \* \* \*

Seven gentlemen were elected members of the Club; and Mr. Atkinson, of Wylam Hall, kindly opened his grounds to the party on their return, exhibiting his rain gauges, meteorological instruments, and other objects of interest.

Our SECOND FIELD MEETING was held at Chollerford, on January 22nd, where, under the guidance of the Rev. W. T. Shields, the ruins of Cocklaw Tower, a fine Peel keep, were visited. The Rev. Mr. Bird courteously conducted the party through the early Norman church of Chollerton, with its ancient monuments of the Umfraville family, and its organ, built by Father Schmidt in the reign of Queen Elizabeth. After a luncheon, most hospitably provided by Mr. Bird, we proceeded to Gunnerton Crags, a mass of basaltic columns, and a portion of the great Whin Dyke, which extends in a south-westerly direction from Dunstanborough right across Northumberland. Few spots could be selected more interesting to the botanist. Here were collected, among many other basalt-loving plants, the pretty mountain Pink, *Dianthus deltoides*; *Allium vineale*; *Saxifraga tridactylites*, and *granulata*; *Rubus saxatilis*, *Gnaphalium dioicum*, *Geranium lucidum*, *Trifolium striatum*, and *Asplenium trichomanes*. After the botanists had satisfied their curiosity, the party proceeded to Chipchase Castle, still following the line of the railway. Chipchase Castle consists of the remains of an ancient castle of about the eleventh century, and of a more modern, but still venerable residence, added to the stronghold of the Umfravilles by the Herons, in the more peaceful times of 1621. We first inspected the less ancient part of the edifice, with many noble apartments, especially a large music-room, richly decorated, containing a very handsome carved oak chimney-piece, apparently of Dutch or German manufacture, of the beginning of the seventeenth century. The housekeeper obligingly conducted the party over the building, which she seems to take a pride in preserving. The ancient

castle is in good repair; the portcullis, and other defences of the entrance, are still in their places. From the top, which is attained by a somewhat dark and narrow winding stair, a fine view is obtained. The roof is built on corbels, with apertures for throwing down missiles on the heads of assailants. Leaving Chipchase, the party made for the banks of the river at Haughton, passing Barrasford by the way. At many points during the ramble, views of Haughton Castle, which is in one of the most beautiful situations conceivable, were obtained. Mr. Smith and his sons most kindly gave the party every facility for examining the interesting architectural and antiquarian features of his noble mansion, and Mr. and Mrs. Smith had provided a sumptuous luncheon, to which our long walk enabled us to do full justice. We then descended to Chollerford, and, by the kind permission of John Clayton Esq., inspected, though under the discouragement of a down-fall of rain, the interesting remains of the great station of Cilurnum on the Roman Wall. These have been too fully described by Mr. Bruce, in his able work, to require further notice here. We had the satisfaction of mustering fifty-two at dinner, the largest assemblage of which we can yet boast at any field meeting, and afterwards elected twenty-two new members. I had the pleasure of conveying to Mr. Smith, of Haughton Castle, a special vote of thanks for his extreme courtesy and hospitality.

OUR THIRD FIELD MEETING was held at Haltwhistle, on July 26th. From Rosehill station we walked by the banks of the Irthing to Gilsland Hotel, where we breakfasted in the fine hall celebrated as the place where Sir Walter Scott met his "ladie love," but which, alas, will never more entertain a guest, having been burnt to the ground a few days after our visit. We then visited the Sulphur Spa, admired the saxifrages and ferns overhanging the cliffs; and in the woods of Wardrew and heaths beyond, gathered several interesting plants. At Thirlwall Castle, the old seat of the Swinburn family, we found ourselves on the summit of the water shed of England, the Tippleburn flowing east into the Tyne, and the Irthing westward into the Eden. Thence, by the course of the Roman Wall, we ascended the hills

to the Nine Nicks of Thirlwall and Walltown crags. A part of the great basaltic dyke here rises to a considerable elevation, and is broken up into detached masses by wild ravines, from whence the name of the Nine Nicks. The Roman Wall runs along the edge of the crags, pertinaciously adhering to the highest points, and following all the irregularities of the ground with unbroken resolution. Where the rugged nature of the surface does not admit of a fosse, an inner line of work at a considerable distance, and on lower ground, is discernible. Small wayside stations, or guardhouses, may be traced at intervals, and the two important posts of Caervoran and Æsica were visited. The masonry is generally in excellent preservation, and the dressed face of the wall perfect. Some rare plants and insects rewarded our scramble. From the highest points a magnificent mountain panorama was obtained—Crossfell and Alston Moor on the south; westward, Skiddaw, in Westmoreland, and Cryffell, in Kircudbright, could be seen; Cheviot, and many intermediate ranges to the north; while to the east, the long range of crags shut up the view. The Solway Frith was distinctly visible running far up the country, and the Scottish mountains beyond it. We followed the rocky stream down to Haltwhistle, where twenty-three members sat down to dinner, and seven new candidates were elected. Among the plants collected during the day, were *Lysimachia vulgaris* (new to the district), *Saxifraga aizoides*, *Galium boreale*, *Vaccinium uliginosum*, *Geranium columbinum*, *Teesdalia nudicaulis*, *Allium schænoprasum*, *Epilobium angustifolium*, *Hypericum humifusum*, wild cranberry; parsley, oak, and beech ferns.

Our FOURTH MEETING, the most onerous expedition yet undertaken by the Society—that to the Cheviot Hills—was held on the 16th August, and continued three days. From the Belford Station the party walked to Wooler, and on the following morning, after inspecting the objects of interest in the locality, set out in carriages for Langleeferd. By the way a fine prospect of the fatal field of Flodden, and the ground occupied by the armies previous to the battle, was obtained. The road, after crossing a range of high land, descends into the valley, covered with heather now in full bloom, and clad at intervals with

fragments of the primeval forest, beneath which ferns luxuriate; in all, a district unmatched even in the north of England for wildness and beauty. At Langleeford the conveyances departed, and, accompanied by two ladies, who honoured us with their presence and example on the occasion, we commenced the ascent of four miles, mustering seventeen in all. This steep ascent was only varied by the whirr of grouse disturbed in their solitude, and by the beautiful glimpses ever and anon obtained of the sea-coast on the one hand, and of Scotland on the other. The summit was gained at last, and from it prospects, broken by clouds, were obtained of apparently endless ranges of hills, one behind the other, stretching far away into Scotland, Cumberland, and Yorkshire. The top of the mountain is flat and of great extent, scattered over with many peaty pools. After resting under the lee of a ruined bothie, the party skirted the head of Langleeford Hope, and keeping along the ridge leading to the sister mountain of Hedgehope, descended at length into the wild valley of the Breamish. Many of the stronger sex began to complain of the distance, and would, it is to be feared, have altogether given up, had not the noble example of the ladies shamed them into endurance. On the way up or down Cheviot, many subalpine plants were gathered, and among others the maiden pink, (*Dianthus deltoïdes*), red whortleberry (*Vaccinium vitis-idaea*), cloud berry (*Rubus chamaemorus*), *Sedum villosum*, *Parnassia palustris*, and three species of club-moss, or *Lycopodium*—viz., *clavatum*, *selago*, and *alpinum*.

At Staindrop Cairn, a singular abruptly-elevated mass of mountain limestone, the members had the pleasure of meeting, by previous arrangement, Messrs Geo. and T. Tate, and several other members of the Berwickshire Club. Mr. Geo. Tate explained much of interest in the geological structure of the district, a subject on which he is thoroughly at home.

At last Linhope was gained, after a nine hours' walk and fast; and a hearty repast on the grass soon freshened the party for the remaining miles of the day's excursion, and they were not a few. We were met here by R. Carr, Esq., of Hedgeley, our first President, and visited the fine fall of Linhope Linn, now full of

water, and the very complete remains of an ancient British town, consisting of circular huts packed closely together, and surrounded by a wall of greater strength. The graves of the ancient inhabitants dot the heath around, and on Ingram Hill, hard by, recently stood the cairn of some hero of note. The combined forces of the two Clubs were entertained at a very late hour by Mr. and Mrs. Carr, of Hedgeley, with an hospitality the Club can never forget, and after seeking various resting-places for the night, we mustered the next morning at the Bridge of Aln. Here Mr. Langlands, of Bewick, the President of the Berwickshire Club, joined us, and led us to Broom Park, near which we visited the remains of a Peel tower and Roman camp, historically interesting as the meeting place of Lords Dacre and Surrey before the battle of Flodden. Thence passing Bolton, we entered the Duke of Northumberland's Park by Bassington Gate. A beautiful walk led us to the celebrated Hulne Abbey, with its fine windows and cloisters, and curious tombs and monuments scattered around the ruins. The trees in this portion of the park are among the finest in Northumberland, and the sylvan beauty of the scenery contrasted finely with the wild desolation of our wanderings of the previous day. Six new members were afterwards elected at Alnwick.

The FIFTH FIELD MEETING of the season was held at Newbiggen on the 15th September. Indisposition unfortunately prevented me from being in my place, but I have received from my friend, the Secretary, a full report of the proceedings of the day. The old castle of Widdrington, and the ancient house of Chibburn, once the property of the Knight Templars, were visited; and on the beach, near Druridge, many interesting sea-weeds and coralines, as well as molluscs, were discovered, cast up by a recent storm. Amongst the latter *Syndosmya alba* and *prismatica*, *Diplodonta rotundata*, *Solen pellucida*, *Thracia phascolina*, *Cochloidesma pratenu*. The beach was observed in places to be covered with *Diatomacea*, imparting to it an olive hue. These curious microscopic organisms were first ascertained to be as abundant in marine as in fresh water by our valued member, Dr. Donkin, who has already supplied some interesting papers on the



many new species discovered by himself. The ornithologists were also rewarded by seeing many stately herons and other waders on this little disturbed coast, which was well peopled with water-fowl. After visiting the gigantic remains of a sperm-whale in the grounds of C. J. W. Cresswell, Esq., who also politely opened his greenhouses to the party, they explored the mouth of the little river Line, where a number of water-plants were gathered, such as *Scirpus maritimus*, *Ruppia maritima*, *Salsola kali*, *Aster tripolium*, *Arenaria marina* and *rubella*, *Polygonum bistorta*, and *Cakile maritima*. From Newbiggen the party walked to Cambois, where ten sat down to dinner, and two new members were elected.

With this expedition ended our Field Meetings for the year; and if we cannot boast of any important discoveries in natural science, as their direct fruits; yet we may congratulate ourselves on their having, in all respects, answered the purpose with a view to which they were organised. In the first place, I believe never before have our meetings secured such a uniformly large attendance of members. Agreeable and useful acquaintanceships have been formed, or have ripened into friendships, amidst the genial and open discussion of topics of common interest to intelligent and educated men. Information pleasantly obtained has been as pleasantly imparted. The naturalist, the geologist, and the antiquarian, have met on common ground, without the trammels of formal ceremony, have corrected each other's ideas, and spurred each other's zeal. Study in nature's field is a generous thing. We have each our different specialities, but each has appreciated others, and enjoyed the fruits of others' studies. The genial folk lore of Mr. Bigge; the antiquarian studies of Mr. Kell; the geological learning of Mr. Sopwith; the keen, nature-loving eye of Mr. John Hancock; the erudite comparative anatomy of Dr. Embleton; the patient research of Mr. Howse; the microscopical investigations of Messrs Brady and Donkin; the wonderful scientific discoveries of Mr. Albany Hancock; the labours of many others I might name; and above all, the indefatigable energy of our secretary, Mr. Mennell, binding and holding us all together, and infusing his own enterprise into the whole body;—of all these we

can boast—from all we have culled the sweets of knowledge, and I think we are not unmindful of our debt. Few, if any, local societies can boast of so many distinguished practical naturalists; and ours is the reproach if we do not maintain in Newcastle a reputation worthy of old Thomas Bewick, who has left us his mantle. It is a wise regulation of our Club which limits the expenses of our meetings to a sum within the reach of all, and enables many a young lover of nature to secure a healthful holiday far away from the daily drudgery of the desk. Fully can we all reciprocate the feelings of our friend, who lay down on Gunnerton Crag, and exclaimed, “I do not believe to-day in the existence of such a place as the Quayside of Newcastle.” But as we accept Lord Bacon’s maxim, that the end of all study is *fruit*, we have endeavoured, when our northern climate precludes research in the field, to carry on our studies in the closet, and to dispense the *fruit* at our Evening Meetings.

The FIRST EVENING MEETING of the year was held on the 8th December, when we were honoured with the presence of Mr. Sopwith and Mr. Glaisher, both distinguished as meteorologists. Mr. Glaisher presented a copy of the “Proceedings of the Greenwich Natural History Club,” and expressed, on behalf of that Society, his interest in our prosperity. As the subject of meteorology has recently been entered into with much interest by our Society, and has at length occupied its due place in our “Transactions,” I need scarcely enlarge upon Mr. Sopwith’s most valuable address, which is already in print, and, through that gentleman’s kindness, is in the hands of most of us. I would only remind you, in passing, of the lucid manner in which Mr. Sopwith sets forth the practical utility of the study, especially to farmers and fishermen, and the very munificent offer of H. G. the Duke of Northumberland to contribute one half the expense of establishing a series of posts for simple meteorological observatories along our coasts; an offer which we trust will be met in the spirit which originally prompted it. Mr. Sopwith illustrated his address by models of his barometrical indicator.

Mr. Glaisher also addressed us at length on the subject of meteorological observations, giving much practical advice on the

position, character &c., of instruments. He showed by diagrams the beautiful uniformity of correct observations taken with due precaution in different places. He exhibited tables of the rain-fall for many years, and criticised the data of Mr. Watson's paper in our "Transactions," drawing rather the conclusion that the rain-fall of this country is diminishing, and that, as a practical result, we ought to dig our wells deeper, and provide larger reservoirs for the supply of our towns.

At our next EVENING MEETING, held February 2nd, we turned from meteorology to primeval antiquities.

Mr. H. T. Mennell read a paper on the Flint Implements from the Drift and Peat, being a copious abstract of whatever has appeared on the subject in the various scientific journals of the day. The beds in which these implements have been found belong to the post-pliocene formation, or drift, of geologists; consisting of beds of gravel, sand, arenaceous clay, and brick-earth, of varying (but often considerable) thickness. The lower beds abound in mammalian remains, chiefly those of the extinct elephant, rhinoceros, bear, hyæna, tiger, stag, ox, horse, &c. The beds of sand contain the fragile shells of fresh-water mollusca; and above these are beds of brick-earth. It is in the beds of gravel that the flint implements are found. Various writers have mentioned the occurrence of these supposed evidences of man in these deposits. In the year 1797, Mr. Frere (*Archæologia*, vol. xiii.) recorded the discovery of flint implements at Hoxne, in Suffolk, in conjunction with the remains of elephants, at a depth of 11 or 12 feet from the surface, in gravel, overlaid by sand and brick-earth. There are instances of similar discoveries in London and Peterborough. In 1849, M. Boucher de Perthes recorded the occurrence of flint implements in the beds near Amiens and Abbeville—some of which flints, by the courtesy of Mr. Prestwich and Mr. Rupert Jones (Secretary of the Geological Society), Mr. Mennell was able to exhibit to the members. Mr. Prestwich and Mr. Evans, visiting France for the purpose of verifying the discoveries of M. Perthes, found the chalk cliffs near Abbeville and Amiens capped with drift, which is continued down into the valleys, where it assumes a more

arenaceous character, and in which mammalian remains are found. On the hills the drift consists of subangular gravel of 10 to 20 feet in thickness, covered with beds of fine sand; and in the basement beds of gravel the rude implements are found—M. Perthes, Mr. Prestwich, and Mr. Evans having themselves extracted specimens from perfectly undisturbed formations, at a depth of 11 to 16 feet. Mr. Evans concludes that, at a remote period, possibly before the separation of England from the Continent, this portion of the globe was densely populated by man—that the work of his hands was caught up, together with the bones of the extinct mammals, by the rush of waters through whose agency the gravel beds have been formed. There still remains the interesting, but almost insoluble problem, whether we are to carry back the existence of man to the remote period at which these beds are assumed to have been deposited? or are we rather to suppose that they are not of the antiquity commonly assigned to them? The following facts seem to attest their assumed antiquity:—They are now found resting on the tops of hills, forming table-lands of considerable elevation. Great changes, therefore, in the earth's surface (and also in the climate), have occurred since they were deposited—changes of which we have no record, and to which we naturally ascribe a remote antiquity. It is in deposits thus circumstanced that the flints, supposed to be the implements of man, are found. Mr. Thomas Wright, however, the eminent antiquary, and others also, dispute their artificial character; and it is asked why, if these flints have been fashioned by man, no human bones—no other relics of our race than these implements—are found associated with them? With reference to these objections, Mr. Menell thinks it possible enough that no other works of a rude and barbarous race might come down to us; but (he says) it does seem strange that no human bones should be found with the flints, in beds which have preserved, entire and uninjured, not only the large and massive bones of the elephant and the rhinoceros, but also the fragile remains of the mouse, the bat, and the shrew. But, though they may be of human origin, and found in the deposits described, the gravel is water-worn—so also are the

bones therein contained—while the flints are not; and it has been suggested that the beds of drift, with the enclosed mammalian remains, may have been swept away, or disturbed, by local inundations or changes of surface, which have also borne with them the works of a race of men who lived on the surface of the original drift. And hence the intermixture of the implements with the gravel and the remains of mammals—their specific gravity accounting for their basement position. Sir Walter Trevelyan, among others, inclines to this explanation, and puts it clearly in a letter to the *Athenæum*. “Is there not abundant evidence,” says he, “in some of the crag beds, that fossils of very different ages may, amongst diluvium (as this is), be brought together in one bed; so that it can scarcely be considered (without further evidence), from their mere juxtaposition, that the animals whose bones are found in this drift were living at the same period as the men who owned the implements?” These various speculations, and the interest excited in the subject, led Mr. Prestwich, Professor Henslowe, and others, to visit Hoxne, where flint implements were found in 1797, and make investigations on the spot. Mr. Prestwich came to the conclusion that they were discovered with the mammalian bones in some of the lower beds of gravel; while Professor Henslowe attributes them to upper and disturbed deposits, produced by secondary action. The question turns on technical terms employed by the workmen for the various beds, and is one which seems scarcely likely ever to be settled, as nearly the whole of the beds have been excavated in order to obtain the brick-earths for manufacture. Following the communication of Sir Walter Trevelyan, in the *Athenæum*, is a letter by Professor Worsäæ, most of which was read by Mr. Mennell, and of which I give the closing paragraph:—“I offer these comparative remarks in the hope that they may throw some light upon the great and important question of the day—the question about the antiquity of the human race. I fully agree with Sir Charles Lyell, ‘that the evidence is very strong in favour of a very high antiquity,’ as there really is no reason to doubt that true implements of flint, works of human art, frequently have been found in the drift,

with bones of elephants, rhinoceroses, and other extinct animals. I feel convinced that we are at the commencement of some of the most remarkable discoveries which have been lately made, and which certainly will have a great influence upon the further rapid progress of national archæology on the whole, and also upon its emancipation from old and new prejudices, and from so-called historical theories." Professor Worsäe's communication, Mr. Mennell remarked, completes and satisfies almost all the observations and inquiries of the writers previously quoted. "You have before you," he added, "specimens of implements from the gravel beds of Abbeville—from the more recent peat-beds—and, by the kindness of Mr. Kell, we have also the means of comparing them with the ordinary celts of the stone period of antiquaries. Mr. George Lyall, of South Shields, has also been kind enough to bring with him the implements recently found by Mr. Thompson, of Jarrow. These, however, having probably come with the ballast there deposited, we cannot build any theories upon them."

At the close of Mr. Mennell's interesting paper (of which I have given but a meagre abridgment), there was much applause.

Mr. Howse, of South Shields, concurred in the suggestion, that the Jarrow flints had come oversea with ballast. He was the more inclined to this supposition by his discovery in ballast, from time to time, of fossils, specimens of which he now produced—species of the genera *Spatangus*, *Ananchytes*, and *Siphonia* (a sponge)—having been brought over, as he believed, from the north of France. *Echini*, he added, were often found in the ancient barrows, and may have been used as missiles.

Eight new members were elected on this occasion.

Our THIRD EVENING MEETING was held on Thursday, the 22nd February, when Mr. Clapham\* read his paper on the natural formation of sulphur, and Mr. Brady his on the *Foraminifera*.

Of Mr. H. B. Brady's paper the following is a brief summary:—Physiologists (he said) are accustomed to classify vital functions under three heads—those pertaining to Nutrition,

\* As Mr. Clapham's paper will be printed in our "Transactions," an epitome of it is unnecessary here.

Reproduction, and Relation. The faculties of nutrition and reproduction belong in common to animals and vegetables: those of relation are essentially animal; but in how slight a degree they are enjoyed by the lowest types of animal life, he proceeded to show. The most striking of the functions of relation are those connected with what we term the senses—seeing, hearing, smelling, tasting, and feeling; and all these faculties, together with special organs for locomotion and for the prehension of food, we usually find developed, to a greater or less extent, in animals. But Mr. Brady had to call upon his audience to lay aside these ideas for a time, and be content to recognise as an animal a being devoid of all these powers—a minute atom of jelly, floating freely in water, without even a skin—endowed with no special organ whatever—capable only of extending portions of its gelatinous body into irregular thread-like filaments, which, whilst extended, answer the double purpose of assisting locomotion and seizing food—and, these duties performed, coalescing again into an amorphous mass. Such is the *Amœba*—the proteus of animal life. Having considered this gelatinous atom in its naked condition, as in the *Amœba*, and again, covered with a horny membrane, or sometimes a sandy carapace, as in the *Arcellina*, it is easy to ascend one step more, and we then find it provided with a symmetrical calcareous shell. We cannot present in our pages the drawings and mountings by which Mr. Brady showed how widely the various species of *Foraminifera* differ in conformation and appearance. Some consist of only a single cell or chamber; several have numerous chambers arranged end to end in a single line; in a third class, this line of cells is rolled into a spiral form; another has the same spiral arrangement, but consisting of two alternate rows of cells; two or three alternate rows also occur, but not spirally coiled; another class has large chambers arranged down a longitudinal axis; and, lastly, some have the chambers arranged in concentric rings. In almost every other division of Natural History, the limitation of the area inhabited by particular species is well defined; frequently, to name a locality is to afford an index to the specimen, and *vice versa*. But with the *Foraminifera*

it is far different. Not only do species and genera exist over very large areas, but we find forms identical with them in a fossil condition down to the remotest geological epoch. Having enlarged upon this portion of his subject, Mr. Brady came to the revelations of Brooks's sounding lead. Portions of the ocean bed, at depths of upwards of three miles, have been brought up, and submitted to examination. From the reports made by the late Professor Bailey, of New York, upon the microscopic characters of these soundings, we gather that the unctuous, clayey-looking deposit, thus drawn from the deep recesses of the Atlantic, instead of consisting entirely of inorganic matter, as was at first supposed, contained scarcely a trace of anything but living organisms—that it consisted almost wholly of the shells of *Foraminifera*, either perfect or broken. Mr. Brady exhibited mountings of similar character to those of the Atlantic soundings obtained from a depth of about a mile and a half, between Malta and Crete, in the Mediterranean—the same species seeming to predominate at all these great depths. Another curious fact, bearing somewhat on the subject, is, that whilst the bed of the Atlantic is apparently composed entirely of the calcareous shells of *Foraminifera*, that of the Pacific is almost devoid of calcareous deposit, but is made up of the silicious frustules of *Diatomaceæ*. But all observers agree that the deeper the soundings the smaller the proportion of inorganic matter; so that, probably, at the greatest depths, nothing whatever is present upon the floor of the ocean but *Foraminifera* and *Diatomaceæ*, with scattered spicules of sponges and other protozoa. In a geological point of view, this fact is very suggestive, as accounting for the multitudes in which fossil remains are found in the chalk and some other strata. Probably no class of animals has played so important a part in the formation of the crust of the earth as the *Foraminifera*. We may descend into the primary formations, and we find, even in the Silurian strata, their remains, in the form of casts, in a certain sandy clay in some parts of Russia. In the Permian, and in the Magnesian Limestone of our own neighbourhood, there have been discovered species of no less than four genera. The various strata of the Secondary age abound in their



remains. In the Oolite they performed a conspicuous part as the nuclei of the egg-shaped particles of which it is composed. But in the Chalk their prodigious numbers bewilder us. The cliffs of the Kentish coast seem entirely made up of fossil *Foraminifera*. We are told that we speak within bounds when we say that each cubic inch contains the remains of a million individuals; and we know that the same formation extends over thousands of square miles in the S.E. of England and N.W. of France, to an average thickness of a thousand feet. Then the Tertiary formations; the Eocene of the Paris basin, the Miocene of Vienna or San Domingo, the Pliocene of Central Italy, of Spain, or of our own Coralline Crag, and the Pleistocene everywhere, all of them present us with specimens of infinite beauty and in the utmost abundance. A few remarks followed, relative to the forms found on our own coast, collated chiefly from the gatherings of Mr. Alder and Mr. Brady himself. The mode of collecting, and the best localities for search, were also briefly touched upon. In conclusion, Mr. Brady said that he had often thought, when employed over these most interesting objects, that the lines of Wordsworth seemed to be specially written for naturalists—or, at least, that none can endorse the sentiment they convey more fully:—

Thanks to the human heart by which we live,  
 Thanks to its tenderness, its joys, its fears;  
 To me, the meanest flower that blows can give  
 Thoughts that do often lie too deep for tears.

A large number of illustrated mounted specimens were placed upon the table, under microscopes suitably arranged for their exhibition; and thus was brought to a close an address of great interest, to which I feel that I have done the scantiest justice.

Mr. THOMAS THOMPSON exhibited a specimen of *Ommastrephes todarus* (one of the cuttle fishes), found at Tynemouth.

Dr. EMBLETON exhibited, much to the interest of the members, a human skull, and also the skull of a cod-fish, beautifully articulated by Mr. James Flower, of London, in such a manner that they could each be shown as a whole, or in separate sec-

tions, to illustrate the theory that the head is a portion of the vertebral column—that of man consisting of the nasal, frontal, parietal, and occipital vertebræ.

Five candidates were admitted into the Club at this meeting.

In turning from our meetings to the printed "Transactions" now in the hands of our members, I trust we may congratulate ourselves on the activity of our Society. The part for the past year exemplifies the assiduity and research of many of our body in the various branches of knowledge which are comprised in our province. In Meteorology we have two papers by our Secretary, Mr. Mennell, and Mr. Watson, before alluded to; in Antiquarian research, an interesting account by Mr. Johnson, of Roman remains found in the Wear; and in Geology, the study of which we may consider as both the basis and the culminating point of natural science, the valuable contribution of Messrs Kirkby and Jones continues the history of the Permian strata of the county of Durham. Dr. Charlton has supplied us with a learned and accurate summary of the history, so far as yet known, of the former abundance, and present too probable extinction of the Great Auk. Mr. Bold has contributed a paper on the additions to our Entomological knowledge in the year 1858; while Mr. Alder has again enriched our local fauna by two new species of Sertularian Zoophytes found on the Northumberland coast, and illustrated his descriptions by two admirable plates.

While referring to Dr. Charlton's able paper on the Great Auk, I may mention that my late valued friend, Mr. John Wolley, personally known to several of us, whose sudden and early removal hence has left a blank in the ranks of our working ornithologists which can never be filled, had very recently undertaken a voyage to Iceland in prosecution of his researches respecting the Great Auk, which had already occupied several years of his life. He has left behind him an accumulation of notes and papers respecting that bird which have been entrusted to Mr. Alfred Newton, Fellow of Magdalen College, Cambridge, for arrangement and publication. The name of that gentleman is a sufficient guarantee that full justice will be done to Mr. Wolley's MSS. by his literary executor.

While on the subject of our publications, I should mention that the Club exchanges its "Transactions" with many kindred Societies—viz., the Berwickshire Naturalists' Club, the Greenwich Natural History Club, the Plymouth Institution, the Literary and Philosophical of Liverpool, the Dublin University Zoological and Botanical Society, the Yorkshire Philosophical Society, the Botanical Society of Edinburgh, &c., and that it is always glad to increase the number of these corresponding Societies, or to receive presents of scientific works for its library, which the committee hope shortly to make more available for the use of the members than has hitherto been the case.

Beyond our published "Acta," I am happy to be able to inform the Society that our more zealous members have been each, in their respective departments, strengthening the stakes and lengthening the cords of knowledge.

In Geology, Mr. J. W. Kirkby of Sunderland has published, in conjunction with Mr. T. Rupert Jones, in the "Journal of the Geological Society," a paper on the Permian *Chitonidæ*, which will appear in our "Transactions," and will complete our excellent history of the Permian Rocks. He has also prepared a paper, not yet published, on the occurrence of *Lingula Credneri*, a Permian *Brachiopod* in the coal measures of Durham. Mr. Kirkby also promises us a paper on some fish remains from the Durham coal measures, which were discovered in a "mussel band," pierced during the sinking of Ryhope Colliery, consisting of teeth, scales, spines, and bones of more than one species of fish. The rarity of such fossils—indeed, of all animal remains, with the exception of *Anthrocaridæ* in the upper coal measures of our two counties, give these remains a considerable degree of interest.

Meteorology has continued to receive a due share of attention, as the tables of the Rain-fall, compiled by Mr. Mennell from the observations furnished by the Club, will show. In this department also Mr. John Watson, F.R.A.S., has prepared a paper on local climate, which will be presented to the members at the next Evening Meeting.

In Botany, Mr. Daniel Oliver, jun., F.L.S., has contributed several valuable botanical memoirs to the "Transactions of the

Linnæan Society"—viz., on a new species of *Utricularia* from South America; on a new genus of *Hamamelideæ*, and a short account of the British *Herbarium* belonging to the Linnæan Society. His friends in the north will be glad to hear, that his scientific attainments, which were well known to them, have also been recognised at Kew, and that he has, within the last few months, obtained a satisfactory and permanent appointment there. Mr. George S. Brady has, during the past year, found on our coast many rare and hitherto unobserved species of *Algæ*, and has, at the request of the committee, undertaken to prepare a general catalogue of this portion of the Flora for our "Transactions." In a letter on the subject, addressed to me, he says:—"The following are a few notes respecting some of the more interesting forms which I have found during the past year. I am not aware that any of them are previously recorded from this coast, at least not by Dr. Johnston or Winch, whose works contain, I believe, the only published lists of our local *Algæ* .

*Callithamnion Daviesii*, not uncommon on the smaller *Algæ*; a beautiful microscopic parasite.

*C. sparsum*, at Roker, on *Cladophora rupestris*.

*C. floridulum*, at Roker and Whitley.

*C. Hookeri*, on other *Algæ*. Occasionally all along the coast.

*C. polyspermum*. Frequent on perpendicular rocks; I think it probable that this is erroneously noted by Winch as *C. purpurascens*.

*Ceramium acanthonotum*. } Not uncommon.  
*Cer. Deslongchampsii*. }

*Cer. botryocarpum*. Near Seaham Harbour; rare.

*Cer. flabelligerum*. St. Mary's Island; rare.

*Cladophora arcta*. On the North Pier, Sunderland.

*Ectocarpus sphaerophorus*. Seaham and Hendon.

*Enteromorpha clathrata*. Near Sunderland.

*Laminaria fascia* } Near Sunderland.  
*L. stenophylla*. }

*Myrionema punctiforme*. Near Seaham.

*Polysiphonia violacea*. Whitley.

*Sphacelaria filicina*. Near Seaham; a very beautiful plant, and

specially interesting, being a completely southern species, and hitherto, so far as I know, found only at a few stations on the south of England and Ireland.

*S. plumosa*. Marsden and near Sunderland; rare.

You will perhaps think this an unwieldy list, but I might have lengthened it still more. I have, however, selected only those that I thought of some importance. The *Algæ* have been so imperfectly studied that there is little difficulty in laying hold of unrecorded species." Mr. Brady, who is working almost alone in this branch of science, so far as concerns *local* assistance, is particularly desirous of information respecting our *Algæ*, or opportunities for examining authentic local collections. We are all aware how necessary the general co-operation of other observers is for the completion of such a work as Mr. Brady has kindly undertaken.

Mr. Alder has added a few Zoophytes to our local list during the year, among which are two new species of *Campanulariæ*, and a new *Atractylis*. Descriptions of them will shortly be published. A small *Zoanthus*, found by him at Cullercoats a year or two ago, has lately been described by Mr. Gosse in his "Actinologia Britannica," under the name of *Zoanthus Alderi*. It is to be hoped that this new species may be again met with, in order that its characters may be more fully studied in a living state.

Mr. H. B. Brady, F.L.S., has continued his investigations on the *Foraminifera*, and only awaits the results of some deep-water dredging, which he has not yet had the opportunity of undertaking, to prepare a catalogue of our local forms.

To Mr. Albany Hancock's indefatigable researches we are indebted for the discovery, that the microscopical parasites infesting shells of mollusca, and recently described by Kölliker as unicellular *fungi*, and by Wede as *Algæ* (*Confervæ*) are found on our coast. Four or five species have occurred to Mr. Hancock, and it cannot be doubted that many more exist. Mr. H. has been aware of these organisms for several years, but had deferred their examination in the hope of procuring some in a living state. However, since the publication of Kölliker's paper, an abstract of which appeared in the "Proceedings of the Royal Society," he

has paid some attention to the subject, and has been rewarded by obtaining from his own collection of shells, foreign as well as British, between thirty and forty species, some of which are very beautiful dendritic objects. They are much diversified in character, and lie buried in the substratum of the shell, but may generally be discovered by a pocket lens on holding the specimen up against the light. Previous to examination by the microscope, it is usually necessary to reduce the thickness of the matrix in order to secure the requisite transparency. Mr. Hancock observes that all these parasites are not unicellular. He has discovered one which is composed of numerous cells arranged end to end, or, in other words, the tubular branches are divided by septa like some of the *Confervæ*.

Nothing new has been added to our local Molluscan fauna; and Mr. Mennell reports the deep-sea fishing to have been unusually unproductive of our rare Dogger Bank shells. The Rev. A. Merle Norman and others have, however, paid considerable attention to this branch of Natural History, but their collecting has been chiefly on other parts of the British coast.

In Entomology Mr. T. J. Bold has been diligently collecting *Hemiptera* and *Homoptera* during the past year: the results will probably come before us at a future time.

In the study of the Vertebrate forms of animal life, comparatively so few in numbers in our northern latitude, and too conspicuous to have escaped the observation of previous naturalists, there is little for me to recal. In this branch of Natural History it is rather in the study of habits, in anatomical investigation, and in scientific classification, that we must anticipate the onward march of knowledge. New and rare species occur, indeed, from time to time, but rather as stragglers than as denizens; and in birds, especially, there is too much reason to fear that our local catalogue is diminishing rather than increasing. I have, however, to remark on the occurrence of the orange-legged hobby (*Erythropus vespertinus*), near Morpeth, and of two instances of the hobby (*Hypotriorchis subbuteo*), in the north of Northumberland; its first occurrence, so far as I am aware, in that county. On the 13th May, when visiting the Fern Islands, I picked up,

on an uninhabited rock, a fresh male specimen of this bird. On inquiry at the lighthouse, I found that it had been captured a few days previously, in an exhausted state, by the children, who had cut one of its wings, but it had escaped, and two days before my visit had been seen on the rock where I found it. A fortnight afterwards a female specimen was shot under the Cheviots by the gamekeeper of Mr. Roddam, of Roddam. The pair had evidently wandered far out of their latitude to meet their untimely end.

Mr. J. Hancock has had the pleasure of adding a new name to the catalogue of our permanent residents, by discovering the tufted duck (*Fuligula cristata*), breeding in the grounds of Sir W. C. Trevelyan. Of this circumstance we anticipate a detailed account from Mr. Hancock's pen. It is far from improbable that many of our winter visitants would, if unmolested, remain in suitable localities to rear their young. We know this to be the case, *e.g.*, with the woodcock, which, when protected, is by no means uncommon in the breeding season. Even so far south as Hampshire, many pairs hatch their broods on the moors of the Earl of Ilchester. And it is to be hoped that the diffusion of more intelligence among gamekeepers may lead to the preservation of many species now wantonly destroyed or chased away. If sportsmen could be persuaded not to fire at a woodcock after the 1st February, it would soon be as permanent and resident as the snipe, but he is looked upon as a passing stranger, and meets a friendless stranger's fate.

Nor is this disposition to remain confined to our winter visitants. That exquisite little rail, Baillon's crane (*Ortygometra Baillonii*) formerly looked upon as a rare and accidental straggler, has become a summer resident; and I had the pleasure of seeing two nests, with their full complement of eggs, taken last year in Cambridgeshire.

The same would, I believe, hold good of another of our most beautiful visitors, the hoopoe, were it not for the barbarous passion indulged in by many gunners—I will not dignify them by the name of sportsmen—of murdering every uncommon bird they can bring down from behind a hedge. They then immor-

talize their butchery by having the remains distorted into hideous forms under the manipulations of the village bird-stuffer. Now, the hoopoe is a regular summer visitant to other countries of Europe under the same latitude, and, historically, was not uncommon here. Again and again the race has vainly attempted to re-establish itself. It was disgusting to read last spring, week after week, the accounts in our local prints of hoopoes shot here, and hoopoes shot there. The hoopoe is naturally a dependant upon man; his food consists principally of the insects found in dung-hills and in soft soil, for searching which his delicate long bill is so admirably adapted. I know him well in his winter quarters; and there, in the streets of Cairo, or about the tents of an Arab camp in the Sahara, he stalks fearlessly about, an honoured and cherished guest. Why should it not be so here? Why should not his beautiful crest be seen on our lawns, and about our yards, as well as in Denmark or Tunis? Because he has a gorgeous livery, and is no longer protected as formerly by superstition. It would really seem that, on some points, our boasted civilization has become rather barbaric. Our moors and woods are infested by a class of men called gamekeepers, who look upon the multiplication of pheasants as the first duty of man, and the destruction of every other bird bigger than a thrush, as the highest effort of human genius. Too many proprietors are content to leave the management of their preserves entirely to their keepers, and while the man believes that hedgehogs suck cows, and destroy them accordingly, the master is equally credulous as to the hares devoured by white owls, and the pheasants carried off to kestrel's nests. And thus every creature not specially enumerated in the Game Acts is classed as vermin. An instance of this barbarism fell under my notice last spring. The black-headed gull must be well known by all observers of nature as the most beautiful of its tribe, and who has not watched the flocks of this graceful bird as they follow the ploughman, diligently searching for wireworms and grubs in the fresh-turned soil. There are but four breeding places of the black-headed gull in Northumberland, so far as I know, but one of these seems to have fallen under the keeper's ban. Near



the Northumberland Lakes, where there is a large colony of this bird, at the time when the eggs were hatching, the keeper of a neighbouring proprietor (I believe of Sir E. Blackett) went up armed with a bludgeon, brained all the young birds who had just escaped from the shell, and smashed every egg he could find, thus hopelessly destroying the whole progeny of the year. When remonstrated with on his brutality, he replied that they sucked the grouse eggs. Now, I do not mean to assert that it is impossible for a little gull to have sucked a grouse's egg, but every naturalist knows that it is not its natural food, and that so long as the keeper and his dogs did not disturb the grouse from her nest, her eggs would be perfectly safe. In like manner, any falcon, kestrel, and owl, is destroyed that comes within reach of the keeper's gun or traps, to the great detriment of the game, and of the farmers, and to the real protection of the rats and weasels. Who that has gazed on the falcon or the eagle in its native wilds, would not think himself well repaid by even the loss of an occasional rabbit? Who that knows Castle Eden Dene does not appreciate, among the ornaments of that glen, the lively kestrels clinging to the rocks, or hovering over his head, whose protection by Mr. Burdon has certainly not caused the diminution of his partridges.

In noble contrast to the careless indifference of too many landowners, I should ill discharge a debt which we all, as naturalists, owe, did I not gratefully acknowledge the persevering care with which the Ven. Archdeacon Thorp has, for several years, protected the sea-fowl of the Fern Islands. For no advantage to himself, and at no little cost, the Archdeacon has taken those islands and maintains guardians (not gamekeepers) during the spring and summer months, until the young birds shall have been hatched and flown. The results are patent. The terns, which, when he first took the rocks, were dwindling to a few dozen, are already recovering their numbers; the guillemots maintain their strength; the rare roseate tern still lingers among his fellows; the eider duck, reduced to two pair, now breeds in scores, and the little dotterel runs along every scrap of shingle. Meantime, the eider has been chased from all its other haunts on

the coast, and I believe not more than a pair can be found on Coquet. St. Cuthbert's duck is a bird peculiarly interesting in this locality, not only from traditional association, but from those rocks being the most southern limit of this arctic bird. And yet persons calling themselves gentlemen can be found, who will lie in a boat all day, just out of reach of the guards, and amuse themselves by shooting the birds from their nests. Had it not been for the public spirit of Archdeacon Thorp, we should, by this time, probably have had to lament the eider, the guillemot, the roseate, Sandwich, and Arctic terns, as no longer residents on our coasts.

It appears to me that much practical service to the cause of Natural History might be performed by our members were they, in accordance with our rules, zealously, in their several spheres, to exert themselves for the preservation of rare birds and plants. The trowel is often as wantonly wielded as the gun; and I must only request the plunderer of plants to consider every remonstrance now addressed to the sporter as equally applicable to himself. There is a balance in nature: each class of animated life has its functions. There is a mighty struggle for existence going on in all; do not let us wantonly or needlessly aggravate it. Destroy the raptorial, and the beasts of the field increase upon you; weasels pounce on your hares; rats destroy your eggs; and rats and mice levy a tremendous income-tax on the farmer's profits. Naturalists have no political weight, nor are they allies of John Bright in his mischievous crusade on the game-laws; but, considering the unpopularity of those laws in many quarters, it would, perhaps, be the part of prudence so to carry them out as to show that man, as well as nature, can leave a place in our landscape for a creature that is neither a hare nor a pheasant.

The severe winter has not been so prolific as might have been expected of rare northern stragglers, the small flock of wax-wings (*Bombycilla garrula*), and two or three of the little gull (*Larus minutus*), being the most interesting recorded. The latter, perhaps, may rather be noted as a lateral straggler than a northern visitor. In other parts of England, two very singular instances of this lateral deviation from accustomed habits have been noted.

One, the occurrence of the great black-headed gull of the Caspian (*Larus ichthyætos*), in Cornwall; the other, of the Thibetian sand-grouse (*Syrrhaptes paradoxus*), in Norfolk and in Wales, last July. Other specimens, doubtless of the same flock, were obtained in Denmark and in Holland.

At a recent meeting of the Zoological Society, the keeper of the Gardens gave an interesting account of the return, year after year, to the Regent's Park, of a herring-gull, which had been bred there, and which was in the habit of disappearing from spring to the end of autumn. An exemplification of a similar instinct has recently been brought to my notice in our own neighbourhood. During the winter of 1858-59, a hooded crow was caught and given to the son of Mr. Vaux, of Sunderland, who turned it into his garden, where it fed regularly with the poultry. At the end of March, the crow took his departure, doubtless to attend to his matrimonial duties in Norway, for he has this winter returned, and remained domiciled in the garden, roosting regularly in his accustomed tree.

Much curious information on the habits of some of our most interesting birds has been lately published by Messrs Freeman and Salvin in their work on Falconry, to which, as issuing from the press under the co-authorship of a Durham naturalist, it may not be out of place to direct your attention. Mr. Freeman laments the disappearance of the peregrine, "alas! rarely seen. A strange and anomalous civilization is fast blotting out the most complete type of speed, strength, and courage, which belongs of right to these islands, and which the Mightiest Hand placed upon all their cliffs as an index to the hearts and prowess that should protect them." Our authors rightly reprobate the folly of immediately shooting any rare bird, and plead earnestly for mercy to the merlin and peregrine, even from the proprietors of grouse moors. They agree, not only that they are comparatively harmless, but that they are useful, as destroying the diseased birds which would otherwise propagate the grouse disease. And certainly they are right, for we cannot too often repeat, that it is a mistake to disturb unnecessarily that mysterious economy of animal life which regulates and balances the

productiveness of certain species, by the total extermination of creatures that were meant to prey upon others.

I scarcely feel myself justified, while reviewing the local progress of natural science during the past year, in introducing general considerations; but as all faithful students must surely endeavour to contribute their inductions towards the erection of the grand superstructure of *system*, it is impossible but that we have all been deeply interested in the views which, with so much learning and ability, have been recently put forth on the origin and classification of species. I allude particularly to the work of Mr. Darwin on the "Origin of Species," and to Agassiz's "Essay on Classification." The view of Mr. Agassiz, which he had already propounded in his larger American work, being, that there are six grand centres of creation, Palearctic, Nearctic, African, Indian, South American, and Australian. The principle of Mr. Darwin being, that all existent types are divergences from one common origin, brought about by time and circumstances. With some limitations, these two views do not appear to be altogether irreconcilable, though we shall probably pause for clearer demonstration, before either is generally accepted in its entirety. *Time* is Mr. Darwin's grand postulate. If Archimedes asked for *pousto*, and he would move the world, so Mr. Darwin asks for time, and he will produce an Anthropoid ape from a Palæozoic fish.

Lucid and charming as is Mr. Darwin's style, and novel as are his arguments, his conclusions are by no means new. Long since Lamarck broached his development theory, that the various forms of animal life had been formed through different *εξόδαις*, e.g., that a bird feeding by the water's edge gradually, through stretching its neck, had elongated it into the heron's. But his crude theory had been committed to the limbo of forgotten things, when the world was startled, a few years since, by the appearance of the "Vestiges of Creation." That shallow work, sustained by nothing but the most unsupported hypotheses, soon dropped out of notice. Its basis was, that "the creation of life, wherever it takes place, is a chemico-electric operation, by which simple germinal vesicles are produced." "All animated beings, from the simplest and oldest, up to the highest and most recent, are the

results—first, of an inherent impulse in the forms of life to advance in definite times, through grades of organisation terminating in the highest Dicotyledons and Mammalia; secondly, of external physical circumstances, operating and re-acting upon the central impulse to produce the requisite peculiarities of exterior organisation.” Such flimsy speculations were soon shattered by the sledge-hammers of Professor Sedgwick and other geologists, and meanwhile the subject had dropped from notice till Mr. Wollaston published his interesting work on the “Variation of Species,” and two years since, Messrs Darwin and Wallace, in their communications to the Linneæan Society, advanced views which prepared us for Mr. Darwin’s recent work. The style is fascinating, the candour and frankness with which objections are stated must disarm declamation, and yet I must confess to having been somewhat startled by Mr. Darwin’s conclusion, that “organs in a rudimentary condition plainly show that an early progenitor has the organ in a fully developed state.” “I believe,” says he, “that animals have descended from, at most, only four or five progenitors, and plants from an equal or a lesser number.” “Analogy would lead me one step further—viz., to the belief that all animals and plants have descended from some one prototype. But analogy may be a deceitful guide. Nevertheless, all living things have much in common, in their chemical composition, their germinal vesicles, their cellular structure, and their laws of growth and reproduction.” “Therefore, I should infer from analogy that probably all the organic beings which have ever lived on this earth have descended from some primordial form, into which life was first breathed.” Mr. Darwin predicts, from this tremendous conclusion, that classification will prove to be merely a series of genealogies. To support his theory, he argues from the natural variations which occur in our present forms, and enters upon natural selection, the struggle for existence, hybridism, instinct, embryology, and geographical distribution and geological succession, and lays much stress on the imperfection of the geologic record. I cannot help thinking that he draws very largely upon the inference from ignorance, and sometimes forgets that we need a second instance to begin an induction. Still, his work is the

result of long-continued thought and labour, directed by a naturalist of extended attainments and remarkable ability, to consolidate a theory which has some facts on which to rest. Some of his postulates we must allow. All organic beings are liable to vary in some degree, and tend to transmit such variations to their offspring. All, at the same time, tend to increase at a very rapid rate, and their increase is kept in check by the incessant competition of other individuals of the same species, or that of individuals of other species, or by injurious physical conditions. Whatever variation occurs among the individuals of any species of animals or plants which is advantageous for their existence, will give these individuals an advantage over their fellows, and will be probably inherited by their offspring. It is thus that Mr. Darwin assumes all species to have originated.

I feel tempted to say a few words on this, especially, as before the publication of Mr. Darwin's work, I had expressed this opinion in a paper published in the "Ibis," as to many species of birds which I should rather term local *varieties*. But Mr. Darwin maintains that the distinction between species and varieties is an arbitrary one; and he challenges his opponents to say wherein the difference consists. That many naturalists, the Germans especially, have needlessly multiplied species, I freely own; and, moreover, that we frequently apply the term species, for convenience sake, to forms which, at the same time, we are perfectly aware are in reality only varieties. But yet I humbly conceive that the distinction may be a very real one, though we may not always be able to draw the line. Has Mr. Darwin forgotten the old fallacy of the last straw which breaks the camel's back? And yet we know there is such a thing as an overload. Our author, in a somewhat triumphant tone, quotes the instance of the grouse, and alleges the difference of opinion among naturalists as to the specific distinction between Scotch and willow grouse. But here, I believe, no sound naturalist would assert a specific distinction, though the local races be different. Generally speaking, I conceive that there would be no difficulty in the differentiation of species, as an hereditary organism, distinguishable from all others, which either will not hybridize, or of which the hybrids are

sterile. That there may be exceptions is what we should naturally expect, in every case of a general rule. Now, Mr. Darwin admits that he does not know of any thoroughly authenticated cases of perfectly fertile hybrids, but has reason to believe that one or two, as *Phasianus colchicus*, and *torquatus*, are perfectly fertile. But here he assumes a specific distinction, which naturalists have long since rejected. For *torquatus* has been generally acknowledged to be but the local variety of China. I cannot venture to enter upon the cases of plants, which he adduces; but his summary is, that in all other respects, *excluding fertility*, there is a close resemblance between hybrids and mongrels, and thus his conclusion is, that there is no fundamental distinction between species and varieties. I cannot but think that here he concedes the whole argument to his opponents. The case of domestic animals, especially pigeons, is adduced by him in support of his view, and he appeals to us whether, did we not know to the contrary, we should not unhesitatingly have put down the varieties of domestic pigeons as species. I should reply that, when we had ascertained their mutual fertility, and their tendency to return to the original type of the rock-dove, which he admits, we should not have done so. "But," says Mr. Darwin, what man can do for his own purposes, nature, operating by the laws of natural selection, could do if granted a period of sufficient length, as the æons of geology." This is certainly true as an hypothesis, but does it not need more corroborative evidence, while our ignorance of the laws of variation is profound?

Yet such power would Mr. Darwin assign to this process of natural selection, that he maintains the wing of the bat, the leg of the horse, and the claw of the lobster, to be all inherited varieties from the same progenitor. We have been accustomed to attribute these to unity of type. "But," says he, "on my theory, unity of type is explained by unity of descent." Rather, one might reply, in the words of Professor Owen, "the recognition of an ideal exemplar for the vertebrated animals proves that the knowledge of such a being as man must have existed before man appeared, for the Divine mind that planned the archetype also foreknew all its modifications." Mr. Darwin frankly admits

the difficulty which the various instincts present to his theory; and his attempt to show that the instinct of the hive-bee may have been a gradually-acquired habit, is not the least curious and preposterous chapter of his ingenious work.

To the hypothesis of the gradual and continued transmission of life from one species to some other form widely different in structure, geology opposes the records preserved in the organic remains of each successive formation. To remove this difficulty, Mr. Darwin has spared no skill and labour for the establishment, first, of the imperfections of the geologic record; and, secondly, of the enormous lapse of time to be allowed for the deposition of each formation, and for the intervals between them. In order to this, he assumes Professor Ramsay's estimate of the thickness of the British fossiliferous strata at 72,584 feet, or nearly  $13\frac{3}{4}$  miles. But it seems scarcely fair to take the maximum thickness of each individual deposit in different localities, and sum them for a single total. No geologist maintains the thickness of the fossiliferous strata to be in any one place 13 miles. There may be limits even to the length of geologic eras. The Ganges has been computed to pour annually into the sea a sediment sufficient to cover 5,000 square miles for a depth of half an inch. The Amazon, without a delta, must be depositing a far greater mass annually in the depths of the ocean.

Again, he assumes 300,000,000 years for the denudation of the Weald, supposing the action of the water to have been continuous. I think there are considerations which will modify this huge demand on Mr. Darwin's grand reserve of geologic time. First, he does not calculate that the sea would eat away both sides of the Weald at once. This reduces his estimate one-half. Secondly, he assumes that the sea would eat into cliffs 500 feet in height, at the rate of an inch in a century, *i. e.*, that it would work at the rate of a yard in 22 years against a cliff one yard in height. But here he has assumed that the underlying strata would afford the same resistance as the superficial chalk, and he seems altogether to have forgotten the undermining power of the sea's action. Let any observer take the Permian coast of Durham, and watch the excavating power of the waves, and he must indeed multiply



Mr. Darwin's sæcular inch. The highest cliffs are worn down often with greater rapidity than the lower. The sea would work against the perpendicular faces of chalk. We know that, at Whitburn, the whole camping ground of the Sunderland volunteers, during the late war, has been, in forty years, completely absorbed. The same process continues. At Castle Eden, there are portions of the Black Hall rocks which, in the memory of persons now living, were connected with the mainland, which are now 150 yards below high-water mark. Surely Reculver and Richborough, in Kent, Beachy Head, in Sussex, the parishes *Consumpta per Mare*, in Norfolk, might have induced Mr. Darwin to modify his demands on time.

But now he comes to the great difficulty—which he very frankly confesses—that the fossiliferous strata afford him no evidence, and that there are sudden appearances of whole groups of allied species in the various formations, which continues without variation to the close of the epoch. He observes, “that when the same species occur at the bottom, middle, and top of a formation, the probability is that they have not lived on the same spot during the whole period of deposition; but have disappeared and re-appeared, perhaps many times, during the same geological period. So that, if such species were to undergo a considerable amount of modification during any one geological period, a section would not probably include all the five intermediate gradations which must, on my theory, have existed between them, but abrupt, though perhaps very slight change of form.” This does appear to me a *petitio principii*, and an argument from ignorance.

In the career of hypothesis, we come upon a yet more startling assumption. In the Silurian rocks, we find remains at least as distinct from each other as those now obtained on our coasts, and two genera of Molluscs, which are still represented in our fauna. It has been observed that, in order to account for this, Mr. Darwin does not hesitate to plunge back into the eons of past time, and to point to a period as far remote from the earliest known Palæozoic rocks as these are from our era. Not knowing where to find a shred of evidence, for the existence of this enormous

mass of pre-Silurian formations, a new hypothesis is produced, certainly ingenious, but, to our minds, in the highest degree improbable. Mr. Darwin fairly admits that his case is difficult, but tries to satisfy the inquirer by the assurance, that his witnesses are all drowned. "The present continents and oceans," he tells us, "have existed pretty much where they now do, ever since the deposition of the oldest fossiliferous beds; but, before that epoch, other continents existed in the area now filled by oceans. From their waste, formations were formed in the adjoining seas. "The older continents, formed of formations older than any known to us, may now all be in a metamorphosed condition, or may lie buried under the ocean." And in those formations, one after another, throughout millions of ages, the successive forms of the primitive fauna and flora were silently entombed, but no elevatory forces, no volcano, terrestrial or submarine, throughout the countless ages that have since elapsed, have ever brought a "single fragment of those buried continents to the light of day." We shall probably prefer to accept the geologic evidence, so far as it goes, imperfect though it be, than to invent so vast a pre-geologic world.

It is scarcely an answer to reply, that metamorphic action, in the Cambrian and Silurian rocks, has obliterated the traces of the progenitors of living power. What is preserved may be surely accepted, *quantum valeat*, as evidence of the predominant types, and if a *Zostera* could be preserved in the Silurian, and a Crustacean (*Cyclophthalmus Bucklandi*), in the coal measures, there seems no reason why other forms as fragile should not have remained had they abounded. Our induction is very imperfect; but, in the present state of our knowledge, it would seem safer to tread on it than to venture forth in the rudderless bark of pure hypothesis. So far as our induction has yet gone, we can only trace a few of the existing forms up to a certain point, and there they cease. Down to a certain point the extinct forms exhibit all their specific peculiarities, and there they disappear for ever. So far our geologic museums tell of the commencement and end of species, of their first and their last

days, but exhibit no genealogies of developments. Till they do this, I should certainly feel hesitation ere I accepted the doctrine of Mr. Darwin and Topsy, and "speck'd I was not made, but grewed."

Mr. Darwin has escaped much criticism by declining to have anything to do with the origin of the primary mental powers, any more than with that of life itself; and there is only one allusion to the antiquity of man, in which he remarks that Mr. Horner's researches have rendered it in some degree probable that man, sufficiently civilized to have manufactured pottery, existed in the valley of the Nile 13,000 or 14,000 years ago. It is an unfortunate remark, to say the least, as Mr. Horner's discovery was upset by the discovery of a Roman tile below his much vaunted pottery. Even supposing Mr. Horner's theory had not received this cruel blow, it might have been enough to observe, that he omitted two points in his calculations; 1st, That when the delta was further up the country, the deposit there would be annually thicker than at present; and, 2nd, That a piece of pottery would naturally work down in soft water-permeated sediment below the surface on which it was first cast forth.

His strongest argument for hereditary descent seems to me to be the fact of the succession of the same types in the same areas during the Tertiary period. Here geology supplies the evidence. And we must explain it, either by the theory of generation in one spot, with subsequent migration, or by that of Agassiz—different centres of creation. It is presumptuous to pretend to decide; but, for my own part, the doctrine of Agassiz, with some modification, does seem to me the most reasonable. By modification, I mean that to assume *simultaneous* creation, or the repetition of the creation of forms of birds, *e.g.*, and plants, which could migrate to separate regions, and are almost, or altogether identical, is unnecessary. Nor need we accept the doctrine of the immutability of species, against the evidence that species do vary under artificial selection, and therefore might, and probably would do so under the process of natural selection. It seems, in the present state of science, impossible to treat either doctrine as proved or provable.

But there is one element which I cannot eliminate from the consideration, and that is, the historic record of Scripture. There are limits which human reason cannot overpass; but I do not believe that the application of Scripture, as an external authority, ought to be brought to bear, so as to check philosophical investigation. Had Mr. Darwin, or any one else, attempted to prove that the moral, intellectual, or spiritual faculties of man have been gradually developed by the working of natural causes, or the operation of matter upon matter, I should, at the outset, reject all consideration of the theory, as beyond the province of reason, and within that of revelation. No conceivable amount of evidence from the structural affinities of plants or animals, could have the slightest bearings on our convictions as to the origin of conscience, or the Supreme Being, or the immortality of the soul. But Mr. Darwin has carefully avoided this. Still, there does seem to be an anxious desire to shift back and back to the origin of life, and to attribute it to secondary causes. Yet still behind each cause others lie concealed, until, in the order of causation, we are at length led back to that Final One, with which alone the mind can be thoroughly content. "The strain of music from the rich lyre of science flows on, rich and sweet, full and harmonious, but never reaches a close. No cadence is heard with which the intellectual ear can feel satisfied."\* It is not the province of Scripture to teach natural, but moral truth, and no one fact of natural science has Scripture ever taught. Scripture, therefore, speaks according to the appearance of things; and in so doing, makes no sacrifice, as some have pretended, to human ignorance and prejudice. Some deductions of science may appear at first sight startling, because contrary to our commonly received interpretations, not because contrary to Scripture itself. So the discoveries of Galileo appeared 300 years ago. So did the proved existence of extinct creatures, and of death upon the earth before the fall, appear 20 years ago. So, to some, do the arguments for the limited extent of the Noachian deluge appear to-day. But, when we search the Scriptures, we find that these demonstrated truths of geology no more contravene the test of

\* "Inductive Philosophy."

God's Word, than did the demonstration of the solar system. For why? Scripture does not profess to be a cosmogony, or account of the original erection of the material universe. Its object was only to tell man *his* history, *his* origin and fall, and to draw his mind to *his* Redeemer. The only cosmogony is in Genesis i. 1, "*created.*" In the whole of the rest of the account the word, as every Hebrew scholar knows, is simply "*did,*" or "*formed.*" And thus criticism rises up and teaches us to harmonize Scripture and Science. It is the same as to the universality of the deluge. The strongest term, "the hills that were under the whole heavens," is used elsewhere when the context shows that only Palestine and its immediate neighbourhood could be implied.

In like manner, we may rest calmly assured, that however the now vexed question, of the origin of species, ultimately be decided by science, all proved facts will be found, like their predecessors, in perfect accordance with Scripture. The two have never yet been found at variance, though they have often been charged with being so. The great truths of the one—the origin of man, the origin of evil, the promise of a Saviour—science never had discovered; and with those revealed truths, are mixed up statements respecting the condition of the earth. The language of that record was fixed thousands of years ago, while science was in its infancy. Meanwhile it has been opening the book of nature, and of late years has been rapidly turning over its countless leaves. Is it to be wondered at that the immature deductions of science have sometimes appeared to contradict Scripture, while those settled results, on which all are agreed, have only tended to confirm and illustrate the sacred volume. Let us then pursue the investigation of nature in an unbiassed and truth-seeking spirit, but let us lay our conclusions reverently at the feet of revelation, and see how they harmonise. The pursuit of natural science is more than a luxury, it is a duty. "To live in ignorance of the history and material laws of the universe of which he forms a part, is a libel on that commanding gift with which God has endowed man, rendering him pre-eminent above the rest of His creatures. The progress of science is the setting forth of the

greatness and wisdom of the Creator in His works." Let us then push on—let us not shrink from investigating nature in her most recondite arcana—let us state our difficulties in the broadest, frankest manner. God's revealed, and His natural truth, can never be at variance: it is scientifically unphilosophical, it is theologically mischievous to imagine so. Let us read both books with unwearied perseverance, and with truthful criticism, and so, while drinking the pure draughts of nature's lore, we shall be led "from nature up to nature's God."

Gentlemen, I fear that my lengthened remarks have savoured more of the study than of the field, but the field has been so exhausted by my predecessors, that I have been driven, per force, in-doors. I have to congratulate the Club on the unprecedented accession of fifty-seven new members within the past year, not, however, unaccompanied by the mournful duty, of recording old companions in the walks of science removed by the hand of death, and among these Mr. John Storey, Corr. M. B. S., L. and E., our secretary from 1849 to 1857. He contributed a paper to our "Transactions," in 1851, on the "Plants occurring within five miles of Newcastle," and most of our volumes are enriched by his botanical notes. The preparation of a "Catalogue of the Flora of the two Counties" had been entrusted to Mr. Storey, and he had collected a vast amount of valuable information for this object; but ill health, and other occupations, prevented him from completing this task, which, we yet trust, Mr. D. Oliver may find leisure to accomplish.

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The days and places for the Field Meetings were fixed as under :—

FRIDAY, *June 1*..... Riding Mill.

WEDNESDAY, *June 27th*.. Castle Eden Dene.

FRIDAY, *July 27th*..... Fourstones, Warden, Prudham, and  
Newborough.

WEDNESDAY, *August 22d*. Banks of the Wear, above Durham,  
Brancepeth, &c.