

GEOLOGY DEPARTMENT,

BIRKBECK COLLEGE

THE

GEOLOGICAL MAGAZINE;

OR,

Monthly Journal of Geology:

WITH WHICH IS INCORPORATED

“THE GEOLOGIST.”

NOS. XCI. TO CII.

EDITED BY

HENRY WOODWARD, F.G.S., F.Z.S.,

HONORARY MEMBER OF THE GEOLOGICAL SOCIETIES OF EDINBURGH, GLASGOW, AND NORWICH;
CORRESPONDING MEMBER OF THE NATURAL HISTORY SOCIETY OF MONTREAL; AND OF THE
LYCEUM OF NATURAL HISTORY, NEW YORK.

ASSISTED BY

PROFESSOR JOHN MORRIS, F.G.S., &c., &c.,

AND

ROBERT ETHERIDGE, F.R.S., L. & E., F.G.S., &c.

VOL. IX.

JANUARY—DECEMBER, 1872.

LONDON:

TRÜBNER & Co., 8 AND 60, PATERNOSTER ROW.

F. SAVY, 24, RUE HAUTEFEUILLE, PARIS.

1872.

STEPHEN AUSTIN AND SONS, PRINTERS, BERTFORD.

LIST OF PLATES.

PLATES.	PAGE.
I. Microscopic Structure of the Pitchstones of Arran	1
II. Fossil Ferns	49
III. <i>Rostellaria Pricei</i> , H. Woodw., Grey Chalk, Folkestone	97
IV. <i>Squaloraria polyspondyla</i> , Agassiz, Lower Lias, Lyme Regis	145
V. Oolitic Coniferæ from Solenhofen... ..	193
VI. Tylose in Tertiary Wood from Thanet	241
VII. Chart of a portion of North-West Greenland	289
VIII. Plan of the Sea-shore showing the Position of the Masses of Meteoric Iron found at Ovipak, Greenland	355
IX. A New Arachnide from the Coal-measures, Lancashire... ..	385
X. Palæozoic Crustacea	433
XI. Sections to Illustrate Mr. Tylor's Paper on the Formation of Deltas	485
XII. Graptolites from the Moffat Group	501
XIII. { <i>Orithopsis Bonneyi</i> , Lower Greensand, Lyme Regis	529
{ <i>Satyrites Reynesii</i> , Tertiary, Aix in Provence	529

LIST OF WOODCUTS.

Coast-section of a part of New Colwyn Bay	16
Both sides of a Striated Stone from the Colwyn Blue Clay	16
<i>Roche moutonnée</i> in Anglesey, looking leeward or down-stream	19
Distant view of Moel-y-Tryfan, from near Bangor	26
Section of Marchlyn-mawr	22
<i>Cardiocarpon Lindleyi</i> , Carr., Coal-measures, Falkirk	55
<i>Cardiocarpon anomalum</i> , Carr., Coal-measures, Derbyshire (?)	57
<i>Araucarioxylon (Pinites) Withami</i> , Kraus., Coal-measures, Edinburgh... ..	58
Pine-wood from Wealden at Brook, Isle of Wight	58
<i>Pothocites Grantoni</i> , Paterson, Coal-measures, Edinburgh	58
Pyrites Deposit, Buitron Mine, in the Province of Huelva, in Spain	60
Esquimaux Knife from West Coast of Greenland	73
<i>Endoceras proteiforme</i> , Hall, Coniston Series, near Ambleside	103
<i>Araucarites Häberleini</i> , Dyer	151
<i>Araucarites sphaerocarpus</i> , Carruthers	151
Longitudinal Section of Scale of <i>Araucaria Bidwilli</i>	152
Map of Strata at Whitberry Point, East Lothian... ..	162

	PAGE
Section at Whitberry Point, East Lothian... ..	162
Water-worn Teeth of <i>Carcharodon</i> from the Suffolk Crag	248
Large Tooth of <i>Carcharodon megalodon</i> , Agassiz	249
Fossil Human Skeleton found in the Cavern of Baoussé-rousse	273
Sections to Illustrate Mr. Törnebohm's Theory of the Swedish Åsar	307
Sketch Map of the Malar Basin, showing the direction of the Åsar	308
Section at Welcome Rush, Australia	336
Inland Ice abutting on Land, Greenland	362
Inland Ice extending into the sea, and terminating in a steep edge, Greenland	363
Inland Ice abutting on the bottom of ice-fjord, Greenland	364
Inland Ice abutting on a Mud-bank, Greenland	364
Crinoidal Remains associated with Casts of the Stems of <i>Cypressocrinus</i>	388
General Section of Drifts in the Central part of the Lake District	402
Sections of Roslyn Hill Clay Pit	404, 407
Plans of Roslyn Hill Clay Pit	405, 407
Section in Greenland before any modern denudation has taken place	424
Section in Greenland along a modern Mountain Stream	425
<i>Hemiaspis limuloides</i> , H. Woodw., L. Ludlow, Leintwardine	435
<i>Pseudoniscus aculeatus</i> , <i>Exapinurus Schrenkii</i> , and <i>Bunodes lunula</i>	436
Head-shield of <i>Hemiaspis speratus</i> , Salter... ..	437
Head-shield of <i>Hemiaspis horridus</i> , H. Woodw.	437
Head-shield of <i>Hemiaspis Salweyi</i> , Salter... ..	438
Tubes of <i>Ortonia conica</i> , Nich., growing on valve of <i>Strophomena alternata</i>	447
Succession of Strata at Ekkorfat, Greenland	449
Series of Strata below Atanekerdluk	453
Bituminized Tree-stem from Atanekerdluk	456
Series of Strata at Atanekerdluk	457
The three largest Meteoric Stones, Greenland	462
Range and Evolution of the several Orders of Crustacea in Time	568



ANNUAL REPORT
OF THE
GEOLOGISTS' ASSOCIATION
FOR
1871.

GEOLOGISTS' ASSOCIATION.

REPORT OF THE GENERAL COMMITTEE FOR 1871.

The General Committee of the Geologists' Association have great pleasure in congratulating the members on the continued prosperity and progress of the Association.

During the past year the Papers have equalled in interest and importance those presented to the Association during preceding years, and your Committee have peculiar satisfaction in finding that the attendance at the evening meetings has been large, and the discussions animated and interesting.

The communications on local geology, or the geology of the neighbourhood of London, have been of great interest, and will, without doubt, prove of permanent value.

The visits to the three great Museums of the Metropolis, the British Museum, the Museum of Practical Geology, and the Museum of the Royal College of Surgeons, were in each instance participated in by a large number of members, who conspicuously indicated their appreciation of the great advantage of inspecting specimens under the guidance of Professor Morris, Mr. Etheridge, Mr. Caruthers, Mr. Henry Woodward, and Professor Tennant, who most kindly gave, at the Museums, explanatory lectures. Your Committee feel under great obligations to the authorities of these noble homes of science for their courtesy in giving facilities for the visits of the Association.

A similar lively interest on the part of the members has been taken in the Excursions of the Association, which, during the past year have been of great value, and almost uniformly very successful. To the gentlemen who have contributed their local knowledge, and kindly acted as directors of the several excursions, the warmest thanks of the Association are due, for to them is principally owing the success of the excursions.

Your Committee have again the pleasure of offering, on your behalf, the thanks of the Association to Professor Morris, for the great assistance he has rendered the Association by his lectures in the museum and in the field, as well as by his instructive companionship during the excursions.

To Professor Phillips, the Rev. T. G. Bonney, Professor Buckman, the Rev. P. B. Brodie, Mr. Henry Woodward, and Mr. Harry Seeley, the thanks of the Association are also eminently due.

The Excursions have enabled the members of the Association to examine the following formations, and thereby make themselves acquainted with the Petrology and the Palæontology of these interesting groups of strata :—

- KEUPER—Warwick.
 LOWER LIAS—Harbury and Wilmeote.
 MIDDLE LIAS—Yeovil and South Petherton.
 UPPER LIAS—South Petherton.
 INFERIOR OOLITE—Sherborne and Ham Hill.
 GREAT OOLITE—Oxfordshire.
 FOREST MARBLE—Oxfordshire.
 CORNBURASH—Islip.
 OXFORD CLAY—Oxford.
 CORALLINE OOLITE—Headington and Upware.
 KIMMERIDGE CLAY—Shotover.
 LOWER GREENSAND—Upware.
 GAULT—Cambridge.
 UPPER GREENSAND—Cambridge.
 CHALK—Grays and Riddlesdown.
 NEWER PLIOCENE—Grays, Ilford, and Barnwell.

Your Committee desire to record their appreciation of the great favour shown to the Geologists' Association by the Universities of Oxford and Cambridge, in affording facilities for the inspection of the contents of those magnificent museums, the University Museum of Oxford, and the Woodwardian Museum of Cambridge.

Through the kindness of their respective owners and custodians, the following local and private museums have been inspected during the excursions :—

- Dr. SPURREL'S Museum of Thames Valley Mammalian Remains.
 Mr. JAMES PARKER'S Museum of Reptilian Remains.
 Mr. EARWAKER'S Collection of Jurassic and Cretaceous Fossils.
 The Rev. E. BOWER'S Collection of Mesozoic Fossils.
 Professor BUCKMAN'S Collection of Jurassic Fossils.
 Mr. T. C. MAGGS' and Mr. MONK'S Collections of Yeovil Fossils.
 Sir ANTONIO BRADY'S Collection of Thames Valley Mammalian Remains.
 The Museum of the Warwickshire Natural History and Archæological Society.
 The Rev. P. B. BRODIE'S Collection of Insect Remains.

Your Committee have also to acknowledge, with great pleasure, the hospitality which has been abundantly offered to the members of the Geologists' Association who have taken part in the excursions.

The Rev. T. G. Bonney, of Cambridge, Professor Buckman, the Rev. E. Bower, and Mr. Maggs, of Yeovil, Mr. James Parker, of

Oxford, Sir Antonio Brady, of Stratford, and Mr. Kirshaw, of Warwick, have each contributed greatly to the success and pleasure of the excursions during the past year, by their generous entertainment of our members.

The Library has received numerous accessions, as well by donations from individual members, as by those from metropolitan and provincial societies. Many Scientific Societies correspond and exchange publications with the Geologists' Association, and thus our library is growing annually in value and usefulness to members. There are two hundred and ten books now in the Library, and of that number more than a quarter have been issued to members during the last year, showing how greatly the Library is appreciated.

The past year has been distinguished by the commencement of the publication of Quarterly "Proceedings," and three numbers have already been issued to members. This method of publishing the papers of value read before the Association will, it is hoped, prove more satisfactory to members than that previously adopted.

The number of members of the Association has largely increased during the year, and your Committee have great satisfaction in seeing amongst our new names those of several gentlemen who are already eminent in the scientific world, and other names which are known to be those of earnest students of Geological Science.

It is also matter for congratulation, as attesting the widening influence of the Association, that gentlemen resident at long distances from London are seeking admission to our body, and joining in our excursions, which thus become a means of bringing together geologists from various parts of England, who were previously personally unknown to each other, although well known as possessing great local as well as general geological knowledge.

It has appeared to your Committee desirable that the Laws of the Association should be modified and amended, to bring them into accordance with the altered position of the Association, and the present requirements of the members. A revision of the Laws has accordingly been accomplished, and the revised code has been duly passed at a Special General Meeting of the Association.

The Financial Position of the Association is extremely satisfactory, as will be seen from an inspection of the Treasurer's Account.

Your Committee feel that they but interpret your unanimous wishes, when they tender your thanks to the Council of University College for the courteous continuance of their grant of the Library of the College for the meetings of the Association.

You will be gratified to learn that the Rev. Thomas Wiltshire, M.A., F.G.S., &c., has intimated his willingness to continue to preside over the Association during the ensuing year.

It will be apparent from the foregoing statements that the Geologists' Association has opening before it an increased sphere of usefulness, but your Committee desire the co-operation of each one of your body in their endeavours to make our Association more and more influential for the advancement and diffusion of Geological Knowledge.

The following Papers were read during the year :—

- On the Geology of the Neighbourhood of Portsmouth and Ryde, by CALEB EVANS, Esq., F.G.S.
- On the Range in Time of the Foraminifera, by Professor T. RUPERT JONES, F.G.S.
- On the English Crags, considered in reference to the Stratigraphical Divisions indicated by their Invertebrate Fauna, by ALFRED and ROBERT BELL.
- On South African Diamonds, by Professor TENNANT, F.G.S., &c.
- On the Fauna of the Carboniferous Epoch, by HENRY WOODWARD, Esq., F.G.S.
- On Flint, by M. HAWKINS JOHNSON, Esq., F.G.S.
- On the Upper Limits of the Devonian System, by S. R. PATTISON, Esq., F.G.S.
- On an Exposure of the London Clay, at Child's Hill, Hampstead, by CALEB EVANS, Esq., F.G.S.
- On the Old Land Surfaces of the Globe, by Professor MORRIS, F.G.S.
- On a Recent Exposure of the Glacial Drift at Finchley, by HENRY WALKER, Esq.
- On the Glacial Drifts of North London, by HENRY WALKER, Esq.
- On the Overlapping of several Geological Formations on the North Wales Border, by D. C. DAVIES, Esq.
- Report of the Proceedings of the Geological Section of the British Association at Edinburgh, 1871, by JOHN HOPKINSON, Esq., F.G.S., F.R.M.S.

The following is a list of the Excursions of the past year :—

- | <i>Directors.</i> | |
|--|--|
| Visit to the British Museum, 18th March. | { Prof. Morris, F.G.S.
Henry Woodward, Esq., F.G.S., &c.
William Carruthers, Esq., F.G.S., &c. |
| Visit to the Museum of Practical Geology, 25th March. | { Prof. Morris, F.G.S.
Robert Etheridge, Esq., F.G.S., &c.
Prof. Tennant, F.G.S., &c. |
| Excursion to Cambridge and Upware, and Visit to Woodwardian Museum, 10th and 11th April. | { The President.
The Rev. T. G. Bonney M.A., F.G.S.
Prof. Morris, F.G.S.
Harry Seeley, Esq., F.G.S. |

Visit to the Hunterian Museum of the Royal College of Surgeons, 18th April.	}	Prof. Morris, F.G.S.
Excursion to Belvedere, and visit to Dr. Spurrel's Museum, 29th April.		
Excursion to Oxford, and visit to the University Museum, 12th May.	}	Prof. Phillips, F.R.S., F.G.S.
Excursion to Grays, Essex, 20th May.		J. P. Earwaker, Esq. The President.
Excursion to the Yeovil District, 29th, 30th, 31st May, and 1st June.	}	Prof. Buckman, F.G.S., &c. J. Logan Lobley, Esq., F.G.S., &c.
Excursion to Ilford, and visit to Sir Antonio Brady's Museum, 17th June.		Henry Woodward, Esq., F.G.S. Sir Antonio Brady, F.G.S.
Excursion to Caterham Junction and Riddlesdown, 1st July.	}	J. Logan Lobley, Esq., F.G.S., &c.
Excursion to Warwickshire, and visit to the Museum of the Warwickshire Natural History and Archæological Society, 10th and 11th July.		Rev. P. B. Brodie, M.A., F.G.S. J. W. Kirshaw, Esq., F.G.S.

Your Committee recommend the following list of Officers for the year 1872:—

PRESIDENT.

Rev. Thomas Wiltshire, M.A., F.G.S., F.R.A.S., &c.

VICE-PRESIDENTS.

John Cumming, Esq., F.G.S.		James Thorne, Esq.
Professor John Morris, F.G.S.		Henry Woodward, Esq., F.G.S., F.Z.S.

TREASURER.

William Hislop, Esq., F.R.A.S., 177, St. John Street Road, E.C., and High Street, Tunbridge Wells.

GENERAL COMMITTEE.

Caleb Evans, Esq., F.G.S.	}	Thomas Lovick, Esq.
John Hopkinson, Esq., F.G.S., F.R.M.S.		C. J. A. Meyer, Esq., F.G.S.
James William Ilott, Esq.		John S. Phené, Esq., F.G.S., F.R.G.S.
M. Hawkins Johnson, Esq., F.G.S.		George Potter, Esq., F.R.M.S.
Henry Lee, Esq., F.L.S., F.G.S., F.R.M.S.		Professor Tennant, F.G.S., F.R.G.S.
W. H. Leighton, Esq., F.G.S.		Henry Walker, Esq., F.G.S.

HONORARY SECRETARY.

J. Logan Lobley, F.G.S., 59, Clarendon Road, Kensington Park, W.

HONORARY LIBRARIAN.

Arthur Bott, Esq., F.G.S.

Your Committee have great pleasure in recommending for election as Honorary Members of the Geologists' Association:—

Professor John Phillips, M.A., LL.D., F.R.S., F.G.S., &c., &c., Professor of Geology in the University of Oxford.

Robert Etheridge, Esq., F.R.S., F.G.S., &c., Palæontologist to the Geological Survey of Great Britain.