

THE  
QUARTERLY JOURNAL

OF THE  
GEOLOGICAL SOCIETY OF LONDON.

EDITED BY  
THE ASSISTANT-SECRETARY OF THE GEOLOGICAL SOCIETY.

---

Quod si cui mortalium cordi et curæ sit non tantum inventis hæerere, atque iis uti, sed ad ulteriora penetrare; atque non disputando adversarium, sed opere naturam vincere; denique non belle et probabiliter opinari, sed certo et ostensive scire; tales, tanquam veri scientiarum filii, nobis (si videbitur) se adjungant.  
—*Novum Organum, Præfatio.*

---

VOLUME THE FORTIETH.

1884.

LONDON:  
LONGMANS, GREEN, READER, AND DYER.  
PARIS: FRIED. KLINCKSIECK, 11 RUE DE LILLE; F. SAVY, 24 RUE HAUTEFEUILLE.  
LEIPZIG: T. O. WEIGEL.

SOLD ALSO AT THE APARTMENTS OF THE SOCIETY,

MDCCLXXXIV.

**List**  
OF THE  
**OFFICERS**  
OF THE  
**GEOLOGICAL SOCIETY OF LONDON.**

~~~~~  
Elected February 15, 1884.  
~~~~~

**President.**

Prof. T. G. Bonney, D.Sc., LL.D., F.R.S.

**Vice-Presidents.**

W. Carruthers, Esq., F.R.S.	J. A. Phillips, Esq., F.R.S.
John Evans, D.C.L., LL.D., F.R.S.	Prof. J. Prestwich, M.A., F.R.S.

**Secretaries.**

W. T. Blanford, LL.D., F.R.S.	Prof. J. W. Judd, F.R.S.
-------------------------------	--------------------------

**Foreign Secretary.**

Warrington W. Smyth, Esq., M.A., F.R.S.

**Treasurer.**

Prof. T. Wiltshire, M.A., F.L.S.

**COUNCIL.**

H. Bauerman, Esq. W. T. Blanford, LL.D., F.R.S. Prof. T. G. Bonney, D.Sc., LL.D., F.R.S. W. Carruthers, Esq., F.R.S. John Evans, D.C.L., LL.D., F.R.S. Col. H. H. Godwin-Austen, F.R.S. Henry Hicks, M.D. Rev. Edwin Hill, M.A. G. J. Hinde, Ph.D. John Hopkinson, Esq. Prof. T. McKenny Hughes, M.A. J. W. Hulke, Esq., F.R.S.	J. Gwyn Jeffreys, LL.D., F.R.S. Prof. T. Rupert Jones, F.R.S. Prof. J. W. Judd, F.R.S. J. A. Phillips, Esq., F.R.S. Prof. J. Prestwich, M.A., F.R.S. F. W. Rudler, Esq. Warrington W. Smyth, Esq., M.A., F.R.S. J. J. H. Teall, Esq., M.A. W. Topley, Esq. Prof. T. Wiltshire, M.A., F.L.S. Henry Woodward, LL.D., F.R.S.
--	---

---

**Assistant-Secretary, Librarian, and Curator.**

W. S. Dallas, Esq., F.L.S.

**Clerk.**

Mr. W. W. Leighton.

**Library and Museum Assistant.**

- Mr. W. Rupert Jones.

## TABLE OF CONTENTS.

	Page
BLAKE, Prof. J. F. On the Volcanic Group of St. David's.....	294
BONNEY, Prof. T. G. On the Geology of the South-Devon Coast from Torcross to Hope Cove. (Plate I.).....	1
———. On some Rock-specimens collected by Dr. Hicks in Angle- sey and N.W. Caernarvonshire .....	200
———. Notes on the Microscopic Structure of some Rocks from Guernsey .....	420
———. Note on some Rock-specimens collected by Dr. C. Calla- way in Anglesey .....	583
CALLAWAY, Dr. C. The Archæan and Lower Palæozoic Rocks of Anglesey. With an Appendix by Prof. T. G. BONNEY .....	567
CHAMPERNOWNE, A., Esq. On some Zaphrentoid Corals from British Devonian Beds. (Plates XXI.-XXIII.) .....	497
COLLINS, J. H., Esq. On the Serpentine and Associated Rocks of Porthalla Cove.....	458
CROSSKEY, Dr. H. W. Note on the Ostracoda and Foraminifera of the Shelly Patches at Bridlington Quay .....	323
DAVIES, THOMAS, Esq. Notes on the Microscopic Structure of some Rocks from Pembrokeshire .....	548
DAVIS, J. W., Esq. On some Remains of Fossil Fishes from the Yoredale Series at Leyburn in Wensleydale. (Plates XXVI., XXVII.) .....	614

	Page
DAWSON, Dr. J. W. Observations on the Geology of the Line of the Canadian Pacific Railway .....	376
DUNCAN, Prof. P. MARTIN. On <i>Streptelasma Rameri</i> , a new Coral from the Wenlock Shale. (Plate VII.).....	167
———. On <i>Cyathophyllum Fletcheri</i> , Ed. & H., sp., from the Wenlock Shale, with Remarks on the Group to which it belongs ..	174
———. On the Internal Structures and Classificatory Position of <i>Micrabacia coronula</i> , Goldfuss, sp. ....	561
EUNSON, H. J., Esq. The Range of the Palæozoic Rocks beneath Northampton .....	482
GARDNER, J. S., Esq. British Cretaceous Nuculidæ. (Plates III.-V.) .....	120
GODWIN-AUSTEN, Lieut.-Col. H. H. On the new Railway-cutting at Guildford: The Pleistocene Sands and Drift-Gravels observed there. With Introductory Notes on the Eocene Beds, by W. Whitaker, Esq. ....	599
———. Observations on certain Tertiary Formations at the south base of the Alps, in North Italy .....	855
HICKS, Dr. H. On the Cambrian Conglomerates resting upon and in the vicinity of some Pre-Cambrian Rocks (the so-called Intrusive Masses) in Anglesey and Caernarvonshire .....	187
———. On the Pre-Cambrian Rocks of Pembrokeshire, with especial reference to the St. David's District. With an Appendix by THOMAS DAVIES, Esq. (Plate XXIV.) .....	507
HILL, Rev. E. The Rocks of Guernsey. With an Appendix by Prof. T. G. BONNEY. (Plate XX.) .....	404
HINDE, Dr. G. J. On some Fossil Calcsponges from the Well-boring at Richmond, Surrey. (Plate XXXV.) .....	778
———. On the Structure and Affinities of the Family of the Receptaculitidæ, including therein the Genera <i>Ischadites</i> , Murchison (= <i>Tetragonis</i> , Eichwald); <i>Spharospongia</i> , Pengelly; <i>Acanthochonia</i> , gen. nov.; and <i>Receptaculites</i> , DeFrance. (Plates XXXVI. & XXXVII.) .....	795
HOMERSHAM, COLLETT, Esq. Note on a Deep Boring at Richmond, Surrey .....	724
HUGHES, Prof. T. M <sup>c</sup> K. On some Tracks of Terrestrial and Fresh-water Animals. (Plates VIII.-XI.) .....	178
———. On the so-called <i>Spongia paradoxica</i> , S. Woodward, from the Red and White Chalk of Hunstanton .....	273

TABLE OF CONTENTS.

v

	Page
IRVING, REV. A. On the Dyas (Permian) and Trias of Central Europe, and the true Divisional Line of these two Systems . . .	389
JEFFREYS, DR. J. GWYN. Notes on Brocchi's Collection of Subapennine Shells . . . . .	28
———. List of Shells from the "Basement" Clay at Bridlington Quay. (Plate XV.) . . . . .	319
JOHNSTON-LAVIS, H. J., ESQ. The Geology of Monte Somma and Vesuvius, being a Study in Vulcanology. (Plate II.) . . . . .	35
JONES, T. RUPERT, ESQ. Notes on the Foraminifera and Ostracoda from the Deep Boring at Richmond. (Plate XXXIV.) . . . . .	765
JUDD, PROF. J. W. On the Nature and Relations of the Jurassic Deposits which underlie London. With an Introductory Note on a Deep Boring at Richmond, Surrey, by Collett Homersham, Esq. (Plate XXXIII.) . . . . .	724
JUKES-BROWNE, A. J., ESQ. On some Postglacial Ravines in the Chalk Wolds of Lincolnshire . . . . .	160
KIDSTON, ROBERT, ESQ. On the Fructification of <i>Zelleria</i> ( <i>Sphenopteris</i> ) <i>delicatula</i> , Sternb., sp.; with Remarks on <i>Urnatopteris</i> ( <i>Sphenopteris</i> ) <i>tenella</i> , Brongt., and <i>Hymenophyllites</i> ( <i>Sphenopteris</i> ) <i>quadridactylites</i> , Gutbier, sp. (Plate XXV.) . . . . .	590
KOTO, DR. BUNJIRO. Studies on some Japanese Rocks . . . . .	431
LAMPLUGH, G. W., ESQ. On a Recent Exposure of the Shelly Patches in the Boulder-clay at Bridlington Quay. With Notes on the Fossils by Dr. J. Gwyn Jeffreys, E. T. Newton, Esq., and Dr. H. W. Crosskey. (Plate XV.) . . . . .	312
METCALFE, A. T., ESQ. On further Discoveries of Vertebrate Remains in the Triassic Strata of the South Coast of Devonshire, between Budleigh Salterton and Sidmouth . . . . .	257
MIALL, PROF. L. C. On a new Specimen of <i>Megalichthys</i> from the Yorkshire Coalfield . . . . .	347
NEWTON, E. T., ESQ. On the Occurrence of Antelope Remains in Newer Pliocene Beds in Britain, with the Description of a new Species, <i>Gazella anglica</i> . (Plate XIV.) . . . . .	280
———. On Fishes from Bridlington Quay . . . . .	322
OWEN, SIR RICHARD. On the Skull and Dentition of a Triassic Mammal ( <i>Tritylodon longævus</i> , Owen) from South Africa. (Plate VI.) . . . . .	146
———. On the Cranial and Vertebral Characters of the Crocodilian Genus <i>Plesiosuchus</i> , Owen . . . . .	153

	Page
OWEN, SIR RICHARD. On a Labyrinthodont Amphibian ( <i>Rhytidosteus capensis</i> ) from the Trias of the Orange Free State, Cape of Good Hope. (Plates XVI. & XVII.) . . . . .	333
PARKINSON, C., Esq. The Droitwich Brine-springs and Saliferous Marls. . . . .	248
PENNING, W. H., Esq. Sketch of the High-level Coal-fields of South Africa . . . . .	658
READE, T. MELLARD, Esq. A Delta in Miniature—Twenty-seven Years' Work . . . . .	263
———. Ripple-marks in Drift in Shropshire and Cheshire . . . . .	267
———. Further Notes on Rock-fragments from the South of Scotland imbedded in the Low-level Boulder-clay of Lancashire . .	270
ROBERTS, THOMAS, Esq. On a new Species of <i>Conoceras</i> from the Llanvirn Beds, Abereiddy, Pembrokeshire. (Plate XXVIII.)..	636
RUTLEY, FRANK, Esq. On Strain in connexion with Crystallization and the Development of Perlitic Structure. (Plate XVIII.) ..	340
SHRUBSOLE, G. W., Esq., and G. R. VINE, Esq. The Silurian Species of <i>Glaucome</i> , and a suggested Classification of the Palæozoic Polyzoa . . . . .	329
SMITH, G. V., Esq. On further Discoveries of the Footprints of Vertebrate Animals in the Lower New Red Sandstone of Penrith.	479
SPEARING, H. G., Esq. On the Recent Encroachment of the Sea at Westward Ho!, North Devon . . . . .	474
TEALL, J. J. H., Esq. Petrological Notes on some North-of-England Dykes. (Plates XII. & XIII.) . . . . .	209
———. On the Chemical and Microscopical Characters of the Whin Sill. (Plate XXIX.) . . . . .	640
TOMES, R. F., Esq. A Comparative and Critical Revision of the Madreporaria of the White Lias of the Middle and Western Counties of England, and of those of the Conglomerate at the base of the South-Wales Lias. (Plate XIX.) . . . . .	353
———. A Critical and Descriptive List of the Oolitic Madreporaria of the Boulonnais. (Plate XXXII.) . . . . .	698
VINE, G. R., Esq., and G. W. SHRUBSOLE, Esq. The Silurian Species of <i>Glaucome</i> , and a suggested Classification of the Palæozoic Polyzoa . . . . .	329
———. Polyzoa (Bryozoa) found in the Boring at Richmond, Surrey . . . . .	784

TABLE OF CONTENTS.

vii

	Page
VINE, G. R., Esq. Notes on some Cretaceous Lichenoporidae . . . .	850
WATERS, A. W., Esq. Fossil Cyclostomatous Bryozoa from Australia. (Plates XXX. and XXXI.) . . . . .	674
WHITAKER, W., Esq. Introductory Notes on the Eocene Beds in the new Railway-cutting at Guildford . . . . .	599

---

PROCEEDINGS.

Annual Report . . . . .	9
List of Foreign Members . . . . .	18
List of Foreign Correspondents . . . . .	19
List of Wollaston Medallists . . . . .	20
List of Murchison Medallists . . . . .	21
List of Lyell Medallists . . . . .	22
List of Bigsby Medallists . . . . .	23
Applications of the Barlow-Jameson Fund . . . . .	23
Financial Report . . . . .	24
Award of the Medals &c. . . . .	30
Anniversary Address . . . . .	37
Donations to the Library (with Bibliography) . . . . .	71

---

BADDELEY, Mr. J. Distribution of Gold-mining Districts on the Surface of the Globe . . . . .	63
BONNEY, Prof. T. G. On an Exhibited Specimen of Trowlesworthite . . . . .	7
MELLO, Rev. J. M. Note on a Specimen of Iron Amianthus . . . . .	65
PARKER, Dr. G. W. Notes on the Geology and Mineralogy of Madagascar . . . . .	69

	Page
STANLEY, W. F., Esq. A Correction in the assumed Amount of Energy developed by the Secular Cooling of the Earth as stated in two Papers by the late Robert Mallet, M.A., F.R.S., in the 'Philosophical Transactions' .....	67
STIFFE, Capt. A. W. Note on Fossil Woods from the Prince's Dock, Bombay .....	4
WETHERED, E., Esq. On the Structure and Formation of Coal . . .	59



LIST OF THE FOSSILS FIGURED AND DESCRIBED  
IN THIS VOLUME.

[In this list, those fossils the names of which are printed in Roman type have been previously described.]

Name of Species.	Formation.	Locality.	Page.
------------------	------------	-----------	-------

PLANTÆ.

<i>Hymenophyllites quadridactylites</i> ... <i>Urnatopteris tenella</i> ..... <i>Zeilleria delicatula</i> . Pl. xxv. ....	} Carboniferous ...	} Britain.....	} 596 594 592
---	---------------------	----------------	---------------------

AMORPHOZOA.

<i>Acanthochonia Barrandei</i> . Pl. xxxvii. f. 2 ..... <i>Blastinia cristata</i> . Pl. xxxv. f. 3... — <i>pygmæa</i> . Pl. xxxv. f. 4 ..... <i>Inobolia micula</i> . Pl. xxxv. f. 1..... <i>Ischadites inosculans</i> ..... — <i>Koenigii</i> . Pl. xxxvi. f. 1 ..... — <i>Lindstræmi</i> . Pl. xxxvi. f. 2... — <i>Murchisonii</i> ..... — <i>tessellatus</i> ..... <i>Oculospongia minuta</i> . Pl. xxxv. f. 5 } <i>Peronella nana</i> . Pl. xxxv. f. 2..... } <i>Receptaculites arcticus</i> ..... — <i>australis</i> ..... — <i>calciferus</i> ..... — <i>canadensis</i> ..... — ? <i>carbonarius</i> ..... — <i>neptuni</i> ..... — <i>occidentalis</i> . Pl. xxxvii. f. 3 — <i>orbis</i> ..... — ? <i>rhubifer</i> ..... <i>Sphaerospongia tessellata</i> . Pl. xxxvii. f. 1 .....	Silurian ..... Great Oolite..... Silurian ..... Silurian ..... Silurian ..... Silurian ..... Silurian ..... Great Oolite..... Silurian ..... Silurian ..... Silurian ..... Silurian ..... Carboniferous ... Devonian ..... Silurian ..... Silurian ..... Devonian ..... Devonian .....	Bohemia ..... Richmond ..... Himalaya..... Europe..... Europe..... Russia ..... N. America ..... Richmond ..... Arctic Regions... Australia ..... Canada..... Canada..... Canada..... Germany ..... Eur. and Canada N. America ..... Russia ..... Germany ..... Europe.....	841 781 781 779 840 837 839 838 839 782 780 845 844 845 844 845 841 842 843 845 840
--	---	---	---

Name of Species.	Formation.	Locality.	Page.
<b>RHIZOPODA.</b>			
<i>Cristellaria crepidula</i> . Pl. xxxiv. f. 8 .....	Great Oolite	Richmond	770
— <i>cultrata</i> . Pl. xxxiv. f. 10, 11			765
— <i>italica</i> .....			770
— <i>rotulata</i> . Pl. xxxiv. f. 9 .....			767
— —, <i>Marginulina</i> var. Pl. xxxiv. f. 7 .....			765
—, sp.....			767
<i>Frondicularia oolithica</i> , var. <i>regu-</i> <i>laris</i> . Pl. xxxiv. f. 4.....			769
<i>Lagena lævis</i> . Pl. xxxiv. f. 3 .....			769
<i>Lituola depressa</i> . Pl. xxxiv. f. 2...			765
<i>Marginulina raphanus</i> . Pl. xxxiv. f. 6 .....			769
<i>Planorbulina farcta</i> . Pl. xxxiv. f. 16			770
— <i>Haidingeri</i> . Pl. xxxiv. f. 14, 15 .....			770
<i>Pulvinulina elegans</i> . Pl. xxxiv. f. 17			771
<i>Quinqueloculina</i> , sp. Pl. xxxiv. f. 1			769
<i>Spirillina crassa</i> . Pl. xxxiv. f. 13...			770
— <i>helvetica</i> . Pl. xxxiv. f. 12 ...			770
<i>Vaginulina legumen</i> . Pl. xxxiv. f. 5			769

**COELENTERATA.**

(*Actinozoa.*)

<i>Amplexus tortuosus</i> . Pl. xxiii. f. 3	Devonian.....	Devonshire .....	503
—, sp. Pl. xxi. f. 6 .....			500
—, sp.....			501
<i>Bathycœnia hemisphærica</i> . Pl. xxxii. f. 13, 14 .....	Great Oolite	Boulonnais .....	706
— <i>moneta</i> .....			705
<i>Calamophyllia cassiana</i> . Pl. xix. f. 5-7 .....	Lias .....	South Wales ...	369
— <i>pseudostylina</i> .....	Corallian .....	Boulonnais .....	716
<i>Campophyllum</i> , sp. Pl. xxi. f. 2...	Devonian.....	Devonshire .....	498
<i>Ceratocœnia elongata</i> . Pl. xxxii. f. 3, 4 .....	Great Oolite	Boulonnais .....	703
<i>Cladophyllia subdichotoma</i> . Pl. xix. f. 10, 11 .....	Lias .....	South Wales ...	367
— <i>sublævis</i> .....			367
<i>Confusastrœa magnifica</i> .....	Great Oolite	Boulonnais .....	712
— <i>Rigaudi</i> . Pl. xxxii. f. 20, 21.			711
—, sp.....			712
<i>Convexastrœa Waltoni</i> .....			706
<i>Cryptocœnia microphylla</i> .....			708
— <i>obeliscus</i> .....	706		

Name of Species.	Formation.	Locality.	Page.
CŒLEENTERATA (continued).			
(Actinozoa, continued.)			
<i>Cryptocœnia plana</i> .....	Great Oolite	Boulonnais	707
— <i>Rigauxi</i> .....			707
— sp. ....			708
<i>Cyathocœnia decipiens</i> . Pl. xix. f. 3	Lias	South Wales	372
— <i>incrustans</i> .....			372
<i>Cyathophyllum</i> ? <i>bilaterale</i> . Pl. xxiii. f. 4	Devonian	Devonshire	503
— <i>Fletcheri</i> .....	Wenlock	Shropshire	174
<i>Dimorphophyllia jurensis</i> .....	Corallian	Boulonnais	717
<i>Discocœnia bononiensis</i> . Pl. xxxii. f. 1, 2	Great Oolite	Boulonnais	702
<i>Elysastræa Fischeri</i> .....	Lias	South Wales	368
<i>Isastræa explanata</i> .....	Corallian	Boulonnais	718
— <i>globosa</i> .....	Lias	South Wales	373
— <i>Gümbelii</i> .....	Lias	South Wales	373
— <i>portlandica</i> .....	Corallian	Boulonnais	719
— <i>sinemuriensis</i> .....	Lias	South Wales	373
— <i>tuberosa</i> .....	Great Oolite	Boulonnais	713
<i>Latimæandra sequana</i> .....	Corallian	Boulonnais	718
—, sp. ....	Great Oolite	Boulonnais	718
<i>Lophophyllum</i> , sp. Pl. xxi. f. 3	Devonian	Devonshire	499
<i>Micrabacia coronula</i> .....	Cretaceous	England	561
<i>Microsolena expansa</i> .....	Corallian	Boulonnais	722
—, sp. ....			722
—, sp. ....			722
<i>Montilivaltia caryophyllata</i> .....	Lias	South Wales	374
— <i>perlonga</i> . Pl. xix. f. 9	Great Oolite	Boulonnais	710
— <i>Rigauxi</i> . Pl. xxxii. f. 15-17	Lias	South Wales	362
— <i>simplex</i> .....	Great Oolite	Boulonnais	710
— <i>Walliæ</i> .....	Lias	South Wales	363
—, sp. ....			363
<i>Rhabdophyllia recondita</i> .....			368
—, sp. ....			369
<i>Scyphocœnia staminifera</i> . Pl. xxxii. f. 5-7	Great Oolite	Boulonnais	704
<i>Septastræa excavata</i> ?	Lias	South Wales	373
— <i>rigida</i> .....	Great Oolite	Boulonnais	711
<i>Streptelasma Rameri</i> . Pl. vii. ....	Wenlock	Shropshire	167
<i>Stylastræa dendroidea</i> .....	Lias	South Wales	371
— <i>gibbosa</i> .....			370
— <i>insignis</i> .....			371
— <i>Martini</i> .....			370
— <i>minuta</i> .....			371
— <i>parasitica</i> .....			371
— <i>pedunculata</i> .....			371
— <i>plana</i> . Pl. xix. f. 2			370
— <i>reptans</i> .....			370
— <i>sinemuriensis</i> .....			370
<i>Stylina</i> , sp. ....	Great Oolite		708
—, sp. ....	Corallian		716
<i>Thamnastræa</i> ? <i>latimæandroidea</i> . Pl. xxxii. f. 18, 19	Corallian	Boulonnais	720
— <i>mammosa</i> .....	Great Oolite		714

Name of Species.	Formation.	Locality.	Page.	
CŒLENTERATA ( <i>continued</i> ).				
( <i>Actinozoa</i> , <i>continued</i> .)				
<i>Thecosmilia Brodiei</i> .....	Lias .....	(England .....	366	
— <i>confluens</i> . Pl. xix. f. 7 .....		Warwickshire ...	364	
— <i>dentata</i> .....		England .....	366	
— <i>Duncani</i> .....		South Wales ...	366	
— <i>Hörneshii</i> . Pl. xix. f. 8 .....		Warwickshire ...	364	
— <i>major</i> .....		England .....	367	
— <i>mirabilis</i> .....		England .....	365	
— <i>rugosa</i> . Pl. xix. f. 1 .....		England .....	364	
— <i>serialis</i> .....		South Wales ...	365	
— <i>suttonensis</i> .....		South Wales ...	365	
— <i>Terquemi</i> .....		England .....	366	
—, sp. ....		South Wales ...	365	
<i>Trochoseris oolítica</i> . Pl. xxxii. f. 10-12 .....		Corallian .....	Boulonnais .....	719
<i>Zaphrentis calceoloides</i> . Pl. xxi. f. 1 .....		Devonian .....	Devonshire .....	497
— <i>mudstonensis</i> . Pl. xxiii. f. 2 ...				502
— <i>subgigantea</i> . Pl. xxii. f. 2-5 ...	501			
—, sp. Pl. xxi. f. 4 .....	499			
—, sp. Pl. xxi. f. 5 .....	499			
—, sp. Pl. xxi. f. 7; Pl. xxiii. f. 1 .....	500			
—, sp. Pl. xxi. f. 6 .....	500			
—?, sp. ....	501			
POLYZOA.				
<i>Crisia unipora</i> . Pl. xxx. f. 1 .....	Tertiary .....	Australia .....	683	
<i>Defrancia exaltata</i> . Pl. xxxi. f. 23..			692	
<i>Diastopora diluviana</i> .....	Oolite .....	Richmond .....	787	
— <i>Lamourouxi</i> .....			789	
— <i>microstoma</i> .....			788	
—, var. <i>connectens</i> .....			789	
— <i>patina</i> .....			689	
— <i>suborbicularis</i> .....			689	
<i>Discotubigera clypeata</i> . Pl. xxxi. f. 15, 16, 19 .....	Tertiary .....	Australia .....	690	
— <i>iterata</i> . Pl. xxxi. f. 14, 17 ...			690	
<i>Entalophora neocomiensis</i> .....	Oolite .....	Richmond .....	686	
— <i>raripora</i> .....			686	
— <i>richmondensis</i> .....			791	
—, var. <i>pustulopora</i> .....			792	
— <i>straminea</i> .....			791	
— <i>verticillata</i> .....	685			
<i>Fascicularia conjuncta</i> . Pl. xxx. f. 4, 5 .....	Tertiary .....	Australia .....	693	
<i>Fasciculipora</i> ?, sp. ....			693	
<i>Filisparsa orakeiensis</i> .....	Oolite .....	Richmond .....	686	
<i>Heteropora conifera</i> .....			794	
—, sp. ....			696	
<i>Hornera foliacea</i> .....			688	
— <i>frondiculata</i> .....	687			
<i>Idmonea atlantica</i> .....	Tertiary .....	Australia .....	683	
— <i>bifrons</i> . Pl. xxx. f. 10, 11 ...			685	
— <i>Hochstetteriana</i> . Pl. xxx. f. 12, 13 .....			684	
— <i>Milneana</i> .....			684	
— <i>radians</i> .....	684			

Name of Species.	Formation.	Locality.	Page.
POLYZOA ( <i>continued</i> ).			
<i>Idmonea triquetra</i> .....	Oolite .....	Richmond .....	790
<i>Lichenopora aldingensis</i> .....	Tertiary .....	Australia .....	695
— <i>boletiformis</i> . Pl. xxxi. f. 20, 21 .....			
— <i>cochloidea</i> .....			695
— <i>hispida</i> .....			694
— <i>paucipora</i> .....	Neocomian .....	Unknown .....	853
— <i>Phillipsii</i> ? .....	Oolite .....	Richmond .....	794
— <i>radiata</i> .....	Tertiary .....	Australia .....	694
— <i>variabilis</i> .....			
<i>Pavotubigera dimidiata</i> . Pl. xxxi. f. 25 .....			696
— <i>flabellata</i> .....			691
— <i>gambierensis</i> . Pl. xxx. f. 9 ...			692
<i>Radiopora pustulosa</i> .....	Neocomian .....	Britain .....	851
<i>Reticulipora transennata</i> . Pl. xxx. f. 2, 3, 6, 7 .....	Tertiary .....	Australia .....	689
—, sp. ....			
<i>Stomatopora dichotoma</i> .....	Oolite .....	Richmond .....	786
— <i>granulata</i> , var. minor .....	Tertiary .....	Australia .....	688
— <i>Waltoni</i> .....	Oolite .....	Richmond .....	787
<i>Supercytis</i> ? <i>digitata</i> . Pl. xxxi. f. 22	Tertiary .....	Australia .....	692
<i>Terebellaria</i> ? <i>increscens</i> .....	Oolite .....	Richmond .....	793

## MOLLUSCA.

(*Lamellibranchiata*.)

<i>Leda angulata</i> . Pl. iv. f. 17-19 ...	Blackdown beds	Britain .....	138
— <i>lineata</i> . Pl. iv. f. 13-16 .....			136
— <i>Mariae</i> . Pl. iii. f. 28, 29 .....			138
— <i>phaseolina</i> . Pl. iii. f. 22-24 ; Pl. v. f. 26-29 .....	Gault .....		135
— <i>scapha</i> . Pl. v. f. 21-23 .....	Neocomian .....		138
— <i>Seeleyi</i> . Pl. v. f. 17-20 .....			137
— <i>solea</i> . Pl. iii. f. 30 .....	Gault .....		139
— <i>spathulata</i> . Pl. v. f. 30-34 ...	Neocomian .....		139
— <i>subrecurva</i> . Pl. v. f. 24, 25 ...			135
— <i>Vibrayeana</i> . Pl. iii. f. 17-18, 25 ; Pl. iv. f. 26, 27 .....	Gault .....	Britain .....	137
<i>Nucula albensis</i> . Pl. iii. f. 6-8 ; Pl. iv. f. 24, 25 .....			128
— <i>antiquata</i> . Pl. iv. f. 3-8 .....	Blackdown beds		134
— <i>arduennensis</i> , var. <i>pumila</i> . Pl. iii. f. 19-21 .....			130
— <i>bivirgata</i> . Pl. iii. f. 12-14 ; Pl. iv. f. 20-22 .....	Gault .....		132
— <i>capsæformis</i> . Pl. iii. f. 4, 5 ...			127
— <i>Cornueliana</i> . Pl. v. f. 5-10 ...	Neocomian .....		129
— <i>gaultina</i> . Pl. iii. f. 9-11, 26, 27 .....	Gault .....		134

Name of Species.	Formation.	Locality.	Page.
------------------	------------	-----------	-------

## MOLLUSCA (continued).

## (Lamellibranchiata, continued.)

<i>Nucula impressa</i> . Pl. iv. f. 9-12...	Blackdown beds	Britain.....	128
— <i>Meyeri</i> . Pl. v. f. 14-16 .....	Neocomian .....		130
— <i>obtusa</i> . Pl. iv. f. 1, 2 .....	Blackdown beds		126
— <i>ovata</i> . Pl. iii. f. 1-3; Pl. iv. f. 28-30 .....	Gault .....		125
— <i>pectinata</i> . Pl. iii. f. 15, 16 ...	Neocomian .....		132
— <i>planata</i> . Pl. v. f. 1-4 .....			126
— <i>simplex</i> . Pl. v. f. 11-13 .....			129

## (Gasteropoda.)

<i>Bulla crebristriata</i> . Pl. xv. f. 6 ...	Post-tertiary ...	BridlingtonQuay	322
<i>Littorina? globosa</i> . Pl. xv. f. 1 ...			320
<i>Pleurotoma multistriata</i> . Pl. xv. f. 4 .....			321
<i>Rissoa subperforata</i> . Pl. xv. f. 2 ...			320
— <i>Wyville-Thomsoni</i> . Pl. xv. f. 3 .....			323
<i>Utriculus constrictus</i> . Pl. xv. f. 5...			321

## (Cephalopoda.)

<i>Conoceras llanvirnensis</i> . Pl. xxviii.	Silurian .....	South Wales ...	639
--	----------------	-----------------	-----

## ANNULOSA.

## (Crustacea.)

<i>Bairdia Hilda</i> . Pl. xxxiv. f. 20 ...	Oolite .....	Richmond .....	771
— <i>Juddiana</i> . Pl. xxxiv. f. 18 ...			767
— <i>jurassica</i> . Pl. xxxiv. f. 21 ...			771
— , var. <i>tenuis</i> . Pl. xxxiv. f. 22 .....			771
— <i>trigonalis</i> . Pl. xxxiv. f. 19 ...			767
<i>Cythere Blakeana</i> . Pl. xxxiv. f. 34, 35 .....			772
— <i>Bradiana</i> . Pl. xxxiv. f. 38 ...			772
— <i>drupacea</i> . Pl. xxxiv. f. 30 ...			772
— <i>Guembeliana</i> . Pl. xxxiv. f. 31-33 .....			772
— <i>juglandica</i> . Pl. xxxiv. f. 36, 37 .....			766
— ( <i>Cythereis</i> ) <i>quadrilatera</i> . Pl. xxxiv. f. 39-41 .....			766
— <i>Schwageriana</i> . Pl. xxxiv. f. 27			772
— <i>subconcentrica</i> . Pl. xxxiv. f. 28, 29 .....			766
— ? <i>tenella</i> . Pl. xxxiv. f. 24 .....			768
<i>Cytherella jugosa</i> . Pl. xxxiv. f. 44.			772
— <i>subovata</i> . Pl. xxxiv. f. 43 ...			773
— <i>symmetrica</i> . Pl. xxxiv. f. 42.			773
<i>Cytheridea subperforata</i> . Pl. xxxiv. f. 25, 26 .....			768
<i>Macrocypris Bradiana</i> . Pl. xxxiv. f. 23 .....			772

Name of Species.	Formation.	Locality.	Page.	
VERTEBRATA.				
(Pisces.)				
<i>Astrabodus expansus</i> . Pl. xxvi. f. 11, 12.....	Yoredale Rocks.	Yorkshire .....	630	
<i>Chomatodus lamelliformis</i> . Pl. xxvii. f. 23.....			625	
<i>Cladacanthus paradoxus</i> . Pl. xxvi. f. 1-5 .....			617	
<i>Cladodus Hornei</i> . Pl. xxvii. f. 11... — mucronatus. Pl. xxvii. f. 10... — striatus .....			619 619 619	
<i>Copodus cornutus</i> . Pl. xxvii. f. 22			623	
<i>Ctenopetalus crenatus</i> . Pl. xxvii. f. 18.....			623	
<i>Cyrtanodus gibbus</i> . Pl. xxvii. f. 1, 6			631	
<i>Deltoptychius plicatus</i> . Pl. xxvi. f. 13, 14 .....			628	
<i>Diclitodus scitulus</i> . Pl. xxvii. f. 12			623	
<i>Diplacodus bulboides</i> . Pl. xxvii. f. 20.....			633	
<i>Echinodus paradoxus</i> . Pl. xxvii. f. 10.....			631	
<i>Glyphanodus tenuis</i> . Pl. xxvii. f. 8			621	
<i>Gomphacanthus acutus</i> . Pl. xxvi. f. 9 .....			618	
<i>Hemichladodus unicuspidatus</i> . Pl. xxvii. f. 24 .....			620	
<i>Lophodus angularis</i> . Pl. xxvi. f. 25			628	
— bifurcatus. Pl. xxvii. f. 5.....			628	
— conicus. Pl. xxvi. f. 18 .....			627	
— lævis .....			627	
— reticulatus. Pl. xxvii. f. 2 ...			626	
— serratus. Pl. xxvii. f. 19 .....			627	
<i>Megalichthys Hibberti</i> .....			Coal-measures... Yorkshire .....	347
— Pl. xxvi. f. 8 .....				633
<i>Petalodopsis tripartitus</i> . Pl. xxvi. f. 16.....				622
<i>Petalodus acuminatus</i> . Pl. xxvi. f. 10.....				624
<i>Physonemus hamatus</i> . Pl. xxvi. f. 6				617
<i>Pleurodus Woodi</i> . Pl. xxvii. f. 14-17 .....				624
<i>Pœcilodus corrugatus</i> . Pl. xxvii. f. 21.....			Yoredale Rocks. Yorkshire .....	625
<i>Pristicladodus concinnus</i> . Pl. xxvi. f. 15.....				621
— dentatus. Pl. xxvii. f. 4 .....				620
<i>Pristodus falcatus</i> . Pl. xxvi. f. 19, 20 .....				623
<i>Psammodus rugosus</i> .....				629
<i>Sandalodus minor</i> . Pl. xxvi. f. 17...)				626

Name of Species.	Formation.	Locality.	Page.
------------------	------------	-----------	-------

VERTEBRATA (*continued*).(*Batrachia*.)

*Rhytidosteus capensis*. Pls. xvi., xvii. | Trias ..... | South Africa ... | 333

(*Mammalia*.)

*Gazella anglica*. Pl. xiv. .... | Pliocene ..... | Britain ..... | 284  
*Tritylodon longævus*. Pl. vi. .... | Trias ..... | South Africa ... | 146



## EXPLANATION OF THE PLATES.

---

PLATE	PAGE
I. {	STRUCTURE IN CLIFF, Torcross, to illustrate Prof. Bonney's paper on the Geology of the South-Devon Coast ..... 1
II. {	SECTIONS OF ROCKS of Monte Somma and Vesuvius, to illustrate Dr. H. J. Johnston-Lavis's paper on their geology... 35
III. {	BRITISH CRETACEOUS NUCULIDÆ, to illustrate Mr. J. S. Gardner's paper on those fossils ..... 120
IV. {	
V. {	
VI. {	SKULL of <i>Tritylodon longævus</i> , to illustrate Sir Richard Owen's paper on a Triassic Mammal from South Africa... 146
VII. {	STREPTELASMA RŒMERI, to illustrate Prof. P. M. Duncan's paper on that Coral ..... 167
VIII. {	
IX. {	TRACKS OF TERRESTRIAL AND FRESHWATER ANIMALS, to illustrate Prof. T. M <sup>c</sup> K. Hughes's paper on that subject ..... 178
X. {	
XI. {	
XII. {	ROCK-SECTIONS, to illustrate Mr. J. J. H. Teall's paper on some North-of-England Dykes ..... 209
XIII. {	
XIV. {	HORN-CORES of <i>Gazella anglica</i> , to illustrate Mr. E. T. Newton's paper on Antelope-remains in Newer Pliocene Beds in Britain .... 280
XV. {	SHELLS from Bridlington Quay, to illustrate Dr. J. Gwyn Jeffrey's descriptions ..... 319
XVI. {	
XVII. {	SKULL of <i>Rhytidosteus capensis</i> , to illustrate Sir Richard Owen's paper on that Amphibian ..... 333
XVIII. {	EFFECTS OF STRAIN in Vitreous Rocks, to illustrate Mr. F. Rutley's paper on that subject..... 340
XIX. {	CORALS from the White Lias &c. of England and Wales, to illustrate Mr. R. F. Tomes's paper on those fossils ..... 353
XX. {	SKETCH-MAP of Guernsey, to illustrate Rev. E. Hill's paper on the Geology of that Island..... 404

PLATE	PAGE
XXI. } XXII. } XXIII. }	ZAPHRENTOID CORALS from Devonshire, to illustrate Mr. A. Champernowne's paper on those fossils ..... 497
XXIV. {	MAP of the St. David's district, to illustrate Dr. Hicks's paper on the Pre-Cambrian Rocks of Pembrokeshire..... 507
XXV. {	ZEILLERIA DELICATULA, to illustrate Mr. R. Kidston's paper on the fructification of that Fern ..... 590
XXVI. } XXVII. }	FOSSIL FISH-REMAINS from Yoredale Rocks, in Wensleydale, to illustrate Mr. J. W. Davis's paper on those fossils ..... 614
XXVIII. {	CONOCERAS LLANVIENENSIS, to illustrate Mr. T. Roberts's description of that fossil ..... 636
XXIX. {	MINERALS of the Whin Sill, to illustrate Mr. J. J. H. Teall's paper on its rocks ..... 640
XXX. } XXXI. }	AUSTRALIAN CYCLOSTOMATOUS BRYOZOA, to illustrate Mr. A. W. Waters's paper on those fossils..... 674
XXXII. {	OOLITIC CORALS from the Boulonnais, to illustrate Mr. R. F. Tomes's paper on those fossils ..... 698
XXXIII. {	SECTIONS OF CHALK from the zone of <i>Belemnites plenus</i> , to illustrate Prof. Judd's paper on the deep boring at Richmond ..... 724
XXXIV. {	FORAMINIFERA AND OSTRACODA from the deep boring at Richmond, to illustrate Prof. T. Rupert Jones's paper on those fossils ..... 765
XXXV. {	CALCISPONGES from the well-boring at Richmond, to illustrate Dr. G. J. Hinde's paper on those fossils ..... 778
XXXVI. } XXXVII. }	RECEPTACULITIDÆ, to illustrate Dr. G. J. Hinde's paper on that family..... 795

---