

## INDEX.

- Aberdour, Lower Carboniferous Rocks near, 364.
- Allanite in the Granite of the North of Scotland, 216.
- Altered sediments on Inchcolm, 131.
- Analyses of minerals and rocks, 40, 106, 204, 290, 358, 396, 397, 417, 418, 419.
- ANDERSON, E. M., On the Temperature-Gradients of Deep Bores, 167.
- — — and A. C. CAMPBELL, Notes on a Transported Mass of Igneous Rock at Comiston Sand-pit, 219.
- Andesite, Brecciated, 69.
- of Ben Nevis, 69.
- Argyllshire Highlands, New Structures in, 363.
- Assyntite, a new rock name, 403.
- Avon, Relation of Don to, at Inchroly, 227.
- BAILEY, E. B., New Structures in the Argyllshire Highlands, 363.
- Balfour Bore, Journal of, 148.
- — — Results of, 143.
- Banffshire Schists, Evidence of Contemporaneous Volcanic Action in, 94.
- Basalt of Dalmeny Type on Inchcolm, 122.
- Ben Nevis, Occurrence of Volcanic Tuffs in, 69.
- — — Andesite of, 69.
- Bibliography of John George Goodchild, 342.
- Blue-ground and Allied Rocks in South Africa, 361.
- Blythswood, Deep bore at, 170.
- Borolanite and its Associates in Assynt (Preliminary Communication), 202.
- — — (Second Communication), 376.
- — — Chemical Analyses of, 417.
- — — On the Use of the Name, 414.
- Boulders in Gravel at Woodhall Colliery, Poncaitland, 140.
- BRIGGS, H., Modern Practice in the Dressing of Lead Ores, 179.
- — — Notes on the Floatation Processes of Ore Extraction, 322.
- Burdiehouse Limestone, 77, 78.
- Caithness, Cretaceous Fossils in, 318.
- Calamites as coal-formers, 79, 83.
- CAMPBELL, A. C., and E. M. ANDERSON, Notes on a Transported Mass of Igneous Rock at Comiston Sand-pit, 219.
- CAMPBELL, R., and A. G. STENHOUSE, The Geology of Inchcolm, 121.
- Cannel Coal, Formation of, 81, 86.
- Carcraig, 130.
- Chemical Analyses of Borolanite and Related Rocks, 417.
- CLOUGH, C. T., with W. WILSON, G. W. LEE, and D. TAIT, The Recently Exposed Section South-east of Portobello, 193.
- Coal Formation, A Theory of, 73.
- Comiston Sand-pit, Notes on a Transported Mass of Igneous Rock at, 219.
- Cramond Island, 130.
- CRAMPTON, C. B., Fossils and Conditions of Deposit, a Theory of Coal Formation, 73.
- — — and D. TAIT, On Certain New Localities for Oil-bearing Shales near Edinburgh, 102.
- Cretaceous Fossils in Caithness, 318.
- Cromaltite, a new rock name, 394.
- CURRIE, J., The Mineralogy of the Færøes, arranged Topographically, 1.
- Deep Bores, Temperature-Gradients of, 167.
- Diamond-bearing Blue-ground and Allied Rocks of South Africa, 361.
- Distribution and Significance of Deviations from the Normal Order of Crystallization, etc., 247.
- — — of Micropegmatite in Granite, 247.
- Don, Relation of, to the Avon, 227.
- Dressing of Lead Ores, Modern Practice in, 179.
- Dukinfield Colliery, Underground temperature at, 171.
- DU TOIT, A. L., The Diamond-bearing Blue-ground and Allied Rocks of South Africa, 361.
- Earthquake, The Hereford, 118.
- — — Waves, 115.
- Earthquakes, Galitzin's curves of artificial, 114.
- East and West Dyke on Inchcolm, 130.
- Edge Coal Series, 193.
- Egg-Shaped Stones Dredged from Wick Harbour, 135.
- Eyed Gneiss, Formation of, 375.
- Færøes, analyses of minerals, List of references to, 8.

- Fæories, Early accounts of mineralogy of, 2.  
 — figures of crystals, List of references to, 9.  
 — Index of localities of minerals, 64.  
 — Index of minerals of, 66.  
 — Literature dealing with, 6.  
 — Map of mineral localities (Plate II.), 10.  
 — Mineralogy of, arranged Topographically, 1.  
 Falkirk, Artesian wells near, 170.  
 False-bedding, Curved, 197.  
 Fauna of the Burdiehouse Limestone, 77.  
 Felsite Sill near Aberdeen, 230.  
 Felspathoidal Rocks, Terminology of, 377.  
 Floatation Processes of Ore Extraction, 322.  
 Fossils:—  
*Anthraco-myia*, 76, 77.  
*Archæocidaris*, 77.  
*Aviculopecten*, 74, 82.  
*Calamites*, 79, 80, 81.  
*Carbonia*, 76, 77.  
*Carbonicola*, 76, 82.  
*Craspedites*, 320.  
*Crioceras*, 320.  
*Desmoceras*, 320.  
*Dictyoxydon*, 354.  
*Dimorphoceras*, 142.  
*Diplolabis*, 357.  
*Dreissensia*, 76.  
*Equisetites*, 80.  
*Glyphioceras*, 142.  
*Goniatites*, 74, 82, 85, 142.  
*Hamites*, 320.  
*Heterangium*, 354, 357.  
*Hippurites*, 78.  
*Lepidodendrea*, 79, 86.  
*Lepidodendron*, 357.  
*Lingula*, 75, 77, 194.  
*Lithostroton*, 73, 74.  
*Lonsdalea*, 73.  
*Naiadites*, 76, 77.  
*Orthoceras*, 77.  
*Paludina*, 77.  
*Pecten*, 85.  
*Platyostomella*, 77.  
*Posidoniella*, 74.  
*Potamides*, 77.  
*Productus*, 364.  
*Spirorbis*, 76, 77.  
*Sigmaria*, 74, 82.  
*Zygopterus*, 357.  
 Fossils and Conditions of Deposit, a Theory of Coal Formation, 73.  
 Fracture planes in sandstone, 197.  
 Galitzin's Curves of artificial earthquakes, 114.  
 GEMMELL, A., Chemical Analyses of Boro-lanite and Related Rocks, 417.  
 Geology and Art, 233.  
 GIBB, A. W., On the Relation of the Don to the Avon at Inchroary, 227.  
 — On a Felsite Sill near Aberdeen, 230.  
 Glacial deposits, 186, 187, 143, 200, 219, 318.  
 Goniatite Bed near Donibristle, On the, 142.  
 Goodchild, John George, Obituary Notice of, 331.  
 GORDON, W. T., On the Nature and Occurrence of the Plant-bearing Rocks at Pettycur, Fife, 353.  
 Granite-Gneiss Contacts, Some Scottish, and their Interpretation, 365.  
 Granton Sandstone, 102.  
 GRANT WILSON, J. S., The Results of the Balfour Bore, Fifeshire, 143.  
 GREGORY, J. W., Obituary Notice of J. G. Goodchild, 331.  
 Hailes Sandstone, 102.  
 Horizontal pendulum described, 109.  
 Hornblende schist, 93.  
 Hornblende granites, 254.  
 Humic acid in soil, 81.  
 Inchcolm, The Geology of, 121.  
 Inchmickery, 130.  
 Inchroary, Relation of the Don to the Avon at, 227.  
 Journal of the Balfour Bore, Fifeshire, 148.  
 Jurassic Rocks in Caithness, 136.  
 Kennetpans, Borehole at, 170.  
 Kirkland Neuk, Deep bore at, 170.  
 KNOTT, C. G., Recent Progress in Seismology, 103.  
 Lead Ores, Dressing of, 179.  
 Ledmorite, a new rock name, 384.  
 LEE, G. W., On the Goniatite Bed near Donibristle, 142.  
 — with W. WILSON, C. T. CLOUGH, and D. TATT, The Recently Exposed Section South-east of Portobello, 193.  
 Leovad Quarry, Concretions in sandstone at, 136.  
 Lime-silicate rock from Balmoral, 368.  
 Limestone, Burdiehouse, 77, 78.  
 — Middle Skateraw, 73.  
 Lit-par-lit injection, 369, 371, 374.  
 Logie Works, Dundee, Deep bore at, 169.  
 Lossie Valley, Note on Two Pieces of Fragmental Volcanic Rocks from, 71.  
 Lower Carboniferous Rocks near Aberdeen, 364.  
 MACKIE, W., Allanite in the Granite of the North of Scotland, 216.  
 — Distribution and Significance of Deviations from the Normal Order of Crystallisation, etc., 247.  
 — Evidence of Contemporaneous Volcanic Action in the Banffshire Schists, 94.  
 — The Occurrence of Volcanic Tuffs on Ben Nevis, 69.  
 MATLEY, C. A., The Lower Carboniferous Rocks near Aberdeen, 364.  
 Meadowbank, Artesian well at, 170.

- Micropegmatite, Distribution and Significance of, in Granite, 247.  
 Millstone Grit, 146.  
 Mineralogy of the Færøes, arranged Topographically, 1.  
 Minerals of the Færøes, Early accounts of, 2.  
 ———— Index of, 66.  
 ———— Localities of, 64.  
 Minerals, New occurrences and special features of (see also Minerals of the Færøes):—  
 Ægirite, 128, 389, 397, 398, 399, 401.  
 Ægirite-augite, 389, 395, 403.  
 Allanite, 216, 217.  
 Analcite, 127, 207.  
 Anorthite, 368.  
 Diopside, 368, 372, 406.  
 Epidote, 216, 368, 406.  
 Fluorite, 211, 218.  
 Garnet, 182, 368.  
 Hornblende, 71, 206, 403, 406.  
 Melanite, 205, 386, 387, 388, 390, 404, 419.  
 "Mesotype," 4.  
 Nephelite, 400, 402.  
 Prehnite, 208.  
 Pseudo-leucite, 203, 211, 392, 400, 408, 410.  
 Pseudo-nephelite, 211, 389, 390.  
 Pyroxene, 205.  
 Rutile, 131.  
 Sodalite, 402.  
 Spinel, 133.  
 "Spreustein," 210, 403, 409.  
 Titanite, 205, 261, 288, 403.  
 Zoisite, 290.  
 Neuffen, Deep bore at, 174, 176.  
 New Structures in the Argyllshire Highlands, 363.  
 Niddrie, Deep bore at, 169.  
 Obituary Notice of John George Goodchild, 331.  
 Oil-bearing Shale, New Localities for, near Edinburgh, 102.  
 — Shales, Analyses of, 106.  
 Old Red Sandstone, Outliers of, in the Neighbourhood of Selkirk, 351.  
 Order of Crystallization, Deviations from the Normal, 247.  
 Ore-concentrators, 187.  
 Ore-crushers, 181.  
 Ore Extraction, Notes on the Floatation Processes of, 322.  
 Ore-screening, 184.  
 Outliers of Old Red Sandstone in the Neighbourhood of Selkirk, 351.  
 Paruschowitz, Deep bore at, 174, 176.  
 Pettycur, Fife, Plant-bearing Rocks at, 353.  
 Pierite of Inchcolm, 123.  
 Plant-bearing Rocks at Pettycur, Fife, 353.  
 Portobello, Section South-east of, 193.  
 Pregny, Deep bore at, 174.  
 PRINGLE, J., Notes on Three Small Outliers of Old Red Sandstone in the Neighbourhood of Selkirk, 351.  
 Pyritous Shales, Origin of, 75.  
 RICHARDSON, R., Geology and Art, 233.  
 Rittinger's Formula, 183.  
 Rose Bridge Colliery, Underground temperature at, 171.  
 Schladebach, Deep bore at, 173.  
 Scotland, Geology, Mineralogy, and Petrology of:—  
 Aberdeenshire (Aberdeen), 230.  
 — (Balmoral), 365.  
 — (Kemnay), 374.  
 — (Kennethmont), 217.  
 — (Rubislaw), 264, 314.  
 — (Tillyfour), 370.  
 Argyllshire (Ballachulish), 262.  
 — (Ben Cruchan), 255, 262, 281, 306, 371.  
 — (Spean Bridge), 363.  
 Banffshire (Ben Rinnes), 216, 263, 264.  
 — (Cabrach), 93.  
 — (Inchrory), 227.  
 Caithness-shire (Leavad), 135, 318.  
 — (Wick), 135.  
 Cromartyshire (Coigach), 404.  
 Edinburghshire (Edinburgh), 102, 219.  
 — (Portobello), 193.  
 Elginshire (Dalmunach), 265.  
 — (Huntly), 260.  
 — (Lossie Valley), 71.  
 Fifeshire (Aberdour), 364.  
 — (Balfour Mains), 143, 148, 167.  
 — (Donibristle), 142.  
 — (Incheolm), 121.  
 — (Pettycur), 353.  
 Haddingtonshire (Pencaitland), 137.  
 Inverness-shire (Abriachan), 218.  
 — (Ben Nevis), 69, 217, 255, 280, 292.  
 — (Skye), 217.  
 Ross-shire (Garve), 290.  
 — (Lewis), 217.  
 Selkirkshire (Selkirk), 351.  
 Shetland (Hildesay), 216, 277.  
 Sutherlandshire (Assynt), 202, 376.  
 — (Ben Laoghal), 216, 255, 259.  
 — (Lairg), 216, 259.  
 Seismograph, The Milne form of, 110.  
 Seismology, Recent Progress in, 108.  
 Seismometer, Construction of, 109.  
 Selkirk, Outliers of Old Red Sandstone in the Neighbourhood of, 351.  
 SHAND, S. J., On Borolanite and its Associates in Assynt (Preliminary Communication), 202.  
 — On Borolanite and its Associates in Assynt (Second Communication), 376.  
 — Some Scottish Granite-Gneiss Contacts and their Interpretation, 365.  
 Silica-saturated magmatic solutions, 284.

- Simplon Tunnel, Temperatures in, 169, 174.
- South Balgray, Deep bore at, 170.
- Hetton, Deep bore at, 171.
- Sperenberg, Deep bore at, 172.
- STENHOUSE, A. G., and R. CAMPBELL, Geology of Inchcolm, 121.
- STEWART, D. R., Analyses of Oil-shales, 106.
- Stigmaria in limestone, 74.
- TAIT, D., On Egg-shaped Stones dredged from Wick Harbour, 135.
- — On the Occurrence of Crataceous Fossils in Caithness, 318.
- — and C. B. CRAMPTON, On Certain New Localities for Oil-bearing Shales near Edinburgh, 102.
- — with W. WILSON, C. T. CLOUGH, and G. W. LEE, The Recently Exposed Section South-east of Portobello, 193.
- Temperature-Gradients of Deep Bores, 167.
- Terminology of felspathoidal rocks, 377.
- Teschenite on Inchcolm, 126.
- Volcanic Action, Evidence of, in the Banffshire Schists, 93.
- Tuffs, Occurrence of, on Ben Nevis, 89.
- Vullinite, a new rock name, 406.
- Wardie Shales, 102.
- — Analyses of oil-shales in, 106.
- WHALLEY, E. B., Notes on a Glacial Gravel Deposit at Woodhall Colliery, Pencaitland, 137.
- Wick Harbour, Egg-shaped Stones dredged from, 135.
- WILSON, J. S. GRANT, The Results of the Balfour Bore, 143.
- W., with C. T. CLOUGH, G. W. LEE, and D. TAIT, The recently exposed Section South-east of Portobello, 193.
- Woodhall Colliery, Glacial Gravel Deposit at, 137.

Price Three Shillings.

TRANSACTIONS  
OF THE  
**Edinburgh Geological  
Society.**

VOL. IX. PART II.



EDINBURGH :

*PRINTED FOR THE SOCIETY BY*

TURNBULL & SPEARS, THISTLE STREET.

LONDON : SIMPKIN, MARSHALL, HAMILTON, KENT & CO., LTD.

1908.

LIST OF OFFICE-BEARERS  
OF THE  
EDINBURGH GEOLOGICAL SOCIETY  
FOR SESSION 1907-08,  
BEING THE SEVENTY-FOURTH.

---

President.

RALPH RICHARDSON, W.S., F.R.S.E.

Vice-Presidents.

JOHN A. JOHNSTON.

C. T. CLOUGH, M.A.

Dr PEACH, F.R.S.

Honorary Secretary.—DAVID GLOAG.

Treasurer.—A. CAMPBELL, 62 Marchmont Road.

Council.

ROBERT CAMPBELL, M.A., B.Sc.

JAMES BISSET, M.A., F.R.S.E.

J. A. GRAHAM MILLER, W.S.

JAMES CURRIE, M.A., F.R.S.E.

ANDREW G. STENHOUSE, F.G.S.

EDWARD B. BAILEY, B.A.

Dr HORNE, F.R.S., F.R.S.E.

CHARLES ALFRED MATLEY, D.Sc.

JAMES R. REID, C.I.E.

Auditors.—R. C. MILLAR, C.A. and T. K. FARQUHARSON

## CONTENTS.

—:O:—

	PAGE
I. WILLIAM MACKIE on Evidence of Contemporaneous Volcanic Action in the Banffshire Schists, . . . . .	93
II. CECIL B. CRAMPTON and D. TAIT on certain New Localities for Oil-Bearing Shale near Edinburgh, . . . . .	102
III. C. G. KNOTT on Recent Progress in Seismology, . . . . .	108
IV. R. CAMPBELL and ANDREW G. STENHOUSE on the Geology of Incheolm, . . . . .	121
V. D. TAIT on Egg-shaped Stones dredged from Wick Harbour, . . . . .	135

---

*\*\* The authors alone are responsible for the facts and opinions contained in their respective papers.*

PUBLICATIONS  
OF THE  
**Edinburgh Geological Society.**

Transactions.		To the Fellows.	To the Public
Volume I.	Part I. (2 Plates), . . . . .	2 0	2 6
"	" II. (6 Plates), . . . . .	<i>Out of Print.</i>	
"	" III. (9 Plates), . . . . .	3 0	5 0
"	Complete, . . . . .	<i>Out of Print.</i>	
Volume II.	Part I. (9 Plates), . . . . .	3 0	5 0
"	" II. (1 Plate), . . . . .	2 0	3 0
"	" III. (4 Plates), . . . . .	4 0	5 0
"	Complete, . . . . .	8 0	12 0
Volume III.	Part I. (4 Plates), . . . . .	<i>Out of Print.</i>	
"	" II. (6 Plates), . . . . .	4 0	5 0
"	" III. (7 Plates), . . . . .	<i>Out of Print.</i>	
"	Complete, . . . . .	<i>Out of Print.</i>	
Volume IV.	Part I. (4 Plates), . . . . .	<i>Out of Print.</i>	
"	" II. (2 Plates), . . . . .	4 0	5 0
"	" III. (1 Plate), . . . . .	4 0	5 0
"	Complete, . . . . .	<i>Out of Print.</i>	
Volume V.	Part I. (2 Plates), . . . . .	4 0	5 0
"	" II. (4 Plates), . . . . .	4 0	5 0
"	" III. (11 Plates), . . . . .	5 0	6 0
"	" IV. (1 Plate), . . . . .	3 0	4 0
"	Complete, . . . . .	12 0	16 0
Volume VI.	Part I. (1 Plate), . . . . .	2 0	3 0
"	" II. (3 Plates), . . . . .	2 0	3 0
"	" III. (4 Plates), . . . . .	2 6	3 6
"	" IV. (3 Plates), . . . . .	1 6	2 0
"	" V. (4 Plates), . . . . .	2 6	3 6
"	Complete, . . . . .	10 0	13 0
Volume VII.	Part I. (2 Plates), . . . . .	2 0	3 0
"	" II. (1 Plate), . . . . .	1 6	2 0
"	" III. (16 Plates), . . . . .	7 0	9 0
"	" IV. (11 Plates), . . . . .	6 0	8 0
"	Complete, . . . . .	14 0	18 0
Volume VIII.	Part I. (3 Plates), . . . . .	5 0	7 0
"	" II. (2 Plates), . . . . .	3 6	5 0
"	Special Part (62 Illustrations), . . . . .	4 0	6 0
"	Part III. (5 Plates), . . . . .	4 0	6 0
"	Complete, . . . . .	15 0	22 0
Volume IX.	Part I. (4 Plates), . . . . .	3 6	5 0
"	" II. (8 Plates), . . . . .	2 0	3 0
"	Roll of Members, . . . . .	0 3	0 6
"	Laws of the Society, . . . . .	0 3	0 6

Orders for the Society's Publications, and all other communications, should be addressed to the Honorary Secretary, Geological Library, India Buildings, Edinburgh.

THE EDINBURGH GEOLOGICAL SOCIETY was founded in 1834 ; but it did not publish Transactions till 1868. Fellows pay an Entrance Fee of 10s. 6d., and an Annual Subscription of 12s. 6d. ; or a single payment may be made for Life of £6 : 16 : 6. Life Members and Fellows who have paid Annual Subscriptions to the amount of Two Guineas may receive the Society's Diploma on payment of a fee of 7s. 6d. Candidates for election must be nominated by two Ordinary Fellows.

The Society is supported solely by the Annual Subscriptions of its Ordinary Fellows, and derives no pecuniary aid from Government.