



THE  
**GEOLOGICAL MAGAZINE.**

VOL. LXV OF WHOLE SERIES.

JANUARY—DECEMBER, 1928.

THE  
GEOLOGICAL MAGAZINE  
OR  
Monthly Journal of Geology.  
WITH WHICH IS INCORPORATED  
THE GEOLOGIST.

FOUNDED IN 1864 BY THE LATE DR. HENRY WOODWARD, F.R.S.

EDITED BY  
R. H. RASTALL, Sc.D., M.INST.M.M.,  
UNIVERSITY LECTURER IN ECONOMIC GEOLOGY, CAMBRIDGE.

ASSISTED BY  
PROFESSOR W. S. BOULTON, D.Sc.  
PROFESSOR J. W. GREGORY, D.Sc., F.R.S.  
F. H. HATCH, PH.D., M.INST.M.M.  
SIR T. H. HOLLAND, K.C.S.I., D.Sc., F.R.S.  
PROFESSOR J. E. MARR, Sc.D., F.R.S.  
PROFESSOR W. W. WATTS, Sc.D., LL.D., M.Sc., F.R.S.  
HENRY WOODS, M.A., F.R.S.  
SIR ARTHUR SMITH WOODWARD, LL.D., F.R.S.

VOL. LXV OF WHOLE SERIES.  
JANUARY—DECEMBER, 1928.

LONDON :  
DULAU & CO., LTD., 32 OLD BOND STREET, W.1.  
1928.

**HERTFORD**  
**STEPHEN AUSTIN AND SONS, LTD.**

## LIST OF PLATES.

PLATE		FACING	PAGE
I.	Calcareous Tufa in Binn Waterfalls . . . . .	1	
II.	Till Overriding Gravel Plain at Cambridge, Mass., U.S.A. . . . .	8	
III.	A Supposed Implement of Quartzite . . . . .	29	
IV.	Views of Badak Mud-flow, Java . . . . .	139	
V.	Peruvian Carboniferous Lamellibranchia . . . . .	152	
VI.	" " "	216	
VII.	" " "	224	
VIII.	" " "	233	
IX.	<i>Amnicola Winkleyi Mozleyi</i> Walker . . . . .	268	
X.	Peruvian Carboniferous Fossils . . . . .	300	
XI.	" " Cephalopoda . . . . .	300	
XII.	" " "	300	
XIII.	Punta Callo, Ecuador. . . . .	346	
XIV.	" The Grand Causeway," Giants Causeway . . . . .	354	
XV.	Jointing in Basalt Columns, Giants Causeway . . . . .	354	
XVI.	<i>Euphorbia ferox</i> . . . . .	400	
XVII.	Quarry scarp in Calcareous Sandstone, Syria. . . . .	412	
XVIII.	" " "	412	
XIX.	" " "	414	
XX.	Colonnade Section, Wembley . . . . .	481	
XXI.	Crater of Shugo Mud-Volcano . . . . .	496	
XXII.	Allanite, Epidote, and Xenotime in Shetland Rocks . . . . .	504	
XXIII.	Hand-specimen of Kaemmererite-serpentine, Shetland Islands . . . . .	504	
XXIV.	Photo-micrographs of Faeröe Rock Types . . . . .	517	

## LIST OF ILLUSTRATIONS IN THE TEXT.

	PAGE
Sketch of temporary exposure, Massachusetts Avenue and Arlington Street, Cambridge, Mass. . . . .	11
Map of District S. of Dublin . . . . .	13
Heavy mineral grains . . . . .	19
Map of district around Ballycorus . . . . .	79
Diagrammatic sections illustrating structure of Carrickgollogan . . . . .	81
Section through the Moel Wnion spur . . . . .	114
Graded curve through the Moel Wnion spur . . . . .	115
Sketch-map of the Dwyka-covered area of S. Africa . . . . .	118
Ideal section of Dwyka deposit . . . . .	119
Section of the Pring torrent (Java) . . . . .	120
Source of Pring torrent (Java) . . . . .	121
Horizontally stratified tuffs of the Batoer Volcano, E. Indies . . . . .	123
Blonkeng Valley, with the Merapi Volcano (Java) . . . . .	124
Deposit left by a "nuée ardente" in the Rivière Sèche (Martinique) . . . . .	127
"Roche moutonnée" with parallel striae protruding from Dwyka conglomerate . . . . .	129
Section on right bank of Elands River (Transvaal) . . . . .	130
Extension and superposition of successive mud-flows descending from the Guntur Volcano . . . . .	133
Ideal section of a lava-flow . . . . .	135
Map showing distribution of plutonic intrusions of the Southern Uplands . . . . .	154
Geological sketch-map of the summit of Pen-Cerig-calch . . . . .	163
Sketch-map of Dominica, B.W.I. . . . .	170
Diagram of Grande Soufrière, Dominica . . . . .	180
Diagrammatic section showing relationship of different strata seen at Eye . . . . .	211
Diagram of rock-marks from Transbaikalia . . . . .	243
<i>Euryocrinus rofei</i> . . . . .	249
Geological sketch-map of the Rubery area of the Lickey Hills . . . . .	256
Section showing relation of rocks exposed in trench at top of Eachway Lane . . . . .	258
Section along Bristol Road between Rubery and Longbridge . . . . .	262
Sketch showing two thrust-planes in quartzite, N. side of Rednal Gorge . . . . .	264
Over-folding in quartzite in quarry E. side of Bilberry Hill . . . . .	265
<i>Gastrioceras amotapense</i> sp. nov. . . . .	294
" <i>pacificum</i> . . . . .	296
" <i>browni</i> . . . . .	298
Part of channel Yons Nab and edge of channel cliff section, Scalby Wyke, Yorks. . . . .	304
Sections at Yons Nab showing shales of Grey Limestone Series and vertical beds of grit, etc. . . . .	305
Copy of section on Geological Survey 1 in. map of Birmingham . . . . .	317
Geological sketch-map of site of new Frankley reservoir, near Birmingham . . . . .	319
Section across reservoir site . . . . .	320
<i>Glossopteris indici</i> Sch. from Ferrar Glacier . . . . .	324
<i>Dadoxylon</i> sp. . . . .	325
<i>Odontocaulis occidentalis</i> . . . . .	326
<i>Dictyonema flabelliforme</i> . . . . .	339
Sketch-map of northern part of province Manabi showing intrusion and chert outcrops . . . . .	341
Sketch-map of Santa Elena peninsula, Ecuador, showing intrusion and chert outcrops . . . . .	344
	345

	PAGE
Crush zone with chert	346
Sketch-map of chert-igneous complex, S.E. of Santa Elena, Ecuador	347
Black silica and white opaque chert	352
Summary of the Faunal Succession in the Cwmgorse Boreholes near Swansea	359
Summary of the Faunal Succession in the Coal-Measures at Maltby, Yorks.	351
Shelly Fossils from Graptolitic Shales, Cardiganshire	365
Comparative Vertical Sections of Downtonian Rocks of Great Britain and N. France	387
Map showing chief outcrops of Downtonian rocks in Western Europe	390
Map of Old Red Sandstone of the Welsh Borderland	393
<i>Euphoberia ferox</i> , various segments and sections	405
Type specimen of <i>Semionites metcalfei</i>	407
Structural map of N.W. corner of the Alston Block	438
Isohypses of the Whin Sill	444
Sketch-map of N.E. Ireland showing distribution of Triassic sandstone	449
Map showing physical geography of N.E. Ireland in Triassic times	467
Base of A shgillian, Principal Sections	485
Sketch-map N.W. side of Rhiwlas Outlier on Creigiau Bychain	491
Diagram of Late-Tertiary folds of Kertch and Taman	496
the Eastern Caucasus	498
Accessory mineral of epidote-bearing granite, Shetlands	501
Diagram showing mineral relationships in chloritoid-andalusite-schist	505
Map of British Honduras	509
Map to illustrate geology of the Faeröe Islands	512
Map of the Skyreholme Anticline	519
Succession of strata in the Skyreholme Anticline	521
Graphs of variation in ornamentation in <i>Batillaria</i>	532
" " " " "	535
Scatter diagrams of variation in <i>Batillaria</i>	537
Variation in ornamentation in <i>Batillaria</i>	538
Map of Upper Devonian of N. Cornwall	543
Chloritoid-phyllite, Morwellham, Devon	548