### **PROCEEDINGS**

 $\mathbf{or}$ 

# THE ROYAL SOCIETY

OF

## EDINBURGH.

VOL. II.

DECEMBER 1844 to APRIL 1850.

# EDINBURGH: PRINTED BY NEILL AND COMPANY. MDCCCLI.

#### CONTENTS.

Account of the late Earthquake at Demerara. By W. H. Camp-	
	ge 1
On the Existence of an Electrical Apparatus in the Flapper Skate	5 -
and other Rays. By Dr Stark,	1
Observations on the Comet, visible now or lately in the Constella-	
tion of the Whale. By C. Rumker, Esq. Communicated by Sir	
T. M. Brisbane, Bart.,	3
On a Possible Explanation of the Adaptation of the Eye to Dis-	
tinct Vision at Different Distances. By Professor Forbes,	6
Notice of an Ancient Beach near Stirling. By Charles Maclaren,	
Esq.,	7
Farther Remarks on the Electrical Organs of the Rays. By Dr	·
Stark,	8
Observations on the same subject. By Professor Goodsir,	9
Note on the Form of the Crystalline Lens. By Professor Forbes.	
Included in the former Abstract,	9
On the Cause which has produced the Present Form and Condi-	
tion of the Earth's Surface. By Sir George S. Mackenzie, Bart.,	9
Some Account of the Magnetic Observatory at Makerstoun, and of	
the Observations made there. By J. A. Broun, Esq. Com-	
municated by Sir T. M. Brisbane, Bart.,	10
Description of a Sliding Scale for Facilitating the Use of the Moist-	
bulb Hygrometer. By James Dalmahoy, Esq.,	13
Account of Experiments to Measure the Direct Force of the	
Waves of the Atlantic and German Oceans. By Thomas	
Stevenson, Esq. Communicated by David Stevenson, Esq., .	13
A Verbal Communication in regard to Chevalier's Experiments on	
the Decomposition of certain Salts of Lead by Charcoal. By	
Dr Traill,	15
On a Peculiar Modification of the Doubly Refracting Structure of	
Topaz. By Sir D. Brewster, K.H.,	16
Extracts from Letters to the General Secretary, on the Analogy	
of the Structure of some Volcanic Rocks with that of Glaciers.	
By C. Darwin, Esq., F.R.S. Specimens were exhibited. With	
Observations on the same subject, made by Professor Forbes,	17
Letter from Professor Gordon, of Glasgow, on the subject of the	
Viscous Theory of Glaciers. Read by Professor Forbes.	19

On the Existence of peculiar Crystals in the Cavities of the Topaz.	
Part I. By Sir D. Brewster, K.H.,	21
On the Use of Colourless Ink in Writing. By Sir George S. Mac-	
kenzie, Bart.,	21
On the Use of Metallic Reflectors for Sextants, and on the Deter-	
mination of the Errors arising from Non-Parallelism in the	
Mirrors and Sun-Shades of Reflecting Instruments. By John	
Adie, Esq.,	22
On the Existence of peculiar Crystals in the Cavities of Topaz.	
Part II. By Sir David Brewster, K.H., . , .	23
On the Extraction of pure Phosphoric Acid from Bones, and on a	
New and Anomalous Phosphate of Magnesia. By Dr Gregory,	25
On the Improvement of Navigation in Tidal Rivers. By David	
Stevenson, Esq.,	26
On the Solvent Action of Drainage Water on Soils. By John	20
	28
Wilson, Esq., F.G.S. Communicated by Dr Gregory,	20
Observations on the Temperature of the Earth at Trevandrum, in	
Lat. 8° 30′ 32″. By John Caldecott, Esq. Reduced, with some	00
Remarks, by Professor Forbes,	29
Miscellaneous Observations on Blood and Milk. By Dr John	00
Davy,	<b>32</b>
An Account of some of Mr Bain's applications of Electricity as a	
moving power to Clocks,	33
On Dr Wollaston's Argument from the limitation of the Earth's	
Atmosphere as to the Finite Divisibility of Matter. By Dr	
George Wilson,	34
Biographical Notice of the late Professor Henderson. By Profes-	
sor Kelland,	35
On the Chemical Relations of Creosote. By Dr Gregory, .	45
On the Thermometric Correction of Magnetic Instruments. By J.	
A. Broun, Esq.,	46
On the Constitution of Bebeerine. By Dr Douglas Maclagan,	
and Thomas G. Tilley, Esq., Birmingham,	46
On the Sums of the Digits of Numbers. By Bishop Terrot, .	49
Notes on the Topography and Geology of the Cuchullin Hills in	
Skye; and on the Traces of Ancient Glaciers which they pre-	
sent. Part I. By Professor Forbes,	<b>5</b> 0
Notes on the Topography and Geology of the Cuchullin Hills in	
Skye; and the Traces of Ancient Glaciers which they present—	
(concluded). By Professor Forbes,	54
On the recent Eruption of Hecla, and the Volcanic Shower in	O I
Orkney. By Dr Traill,	56
On a new variety of Gamboge from the Wynaad. By Dr Christison,	<b>5</b> 8
Results of the Makerstoun Observations, No. 1. On the Relation	90
of the Variations of the Earth's Magnetism to the Solar and	
Lunar Periods. By J. A. Broun, Esq. Communicated by Sir	
T. M. Brisbane, Bart.,	
Histogram on to grad In tractive to an active to the companies of the comp	<b>5</b> 8
Experiments and Investigations as to the influence exerted over	<b>5</b> 8
some Minerals by Animal and Vegetable matter, under certain	<b>5</b> 8
	<i>5</i> 8

on the Action of Soluble Lead Saits on Natural Waters. By Pro-	
fessor Connell,	62
Claudia and Pudens; an attempt to shew that the Claudia men-	
tioned in St Paul's Second Epistle to Timothy, was a British	
Princess. By Archdeacon Williams,	63
On the Decomposition and Dispersion of Light within Solid Bodies.	•
By Sir David Brewster, K.H.,	64
A few Remarks suggested by Professor Forbes's Description of the	v.
effects of Glacial Action among the Cuchullin Hills, and Mr	
Maclaren's views of the facts observed by him at the Gareloch.	G F
By Sir G. S. Mackenzie, Bart.,	65
Remarks on certain grooved surfaces of Rock on Arthur's Seat.	a F
By the Rev. Dr Fleming,	67
Biographical Notice of the late Sir John Robison, K.H., Sec.	0.0
R.S. Ed. By Professor Forbes,	<b>6</b> 8
On a method of rendering Magnetical Instruments Self-Registering.	<u>_</u>
By J. A. Broun, Esq. Communicated by Sir T. M. Brisbane, Bart.,	79
Verbal Notice respecting the Thyroid, Thymus, and Supra-renal	
Bodies. By Professor Goodsir,	80
On the recent Scottish Madrepores, with Remarks on the Climatic	
Character of the Extinct Races. By the Rev. Dr Fleming,	82
On the principle of Vital Affinity, as illustrated by recent Obser-	
vations in Organic Chemistry. Part I. By Dr Alison,	83
On the Personal Nomenclature of the Romans, with an especial re-	
ference to the Nomen of Caius Verres. By the Rev. J. W.	
Donaldson. Communicated by Bishop Terrot,	87
On the appearance of the Great Comet of 1843, at the Cape of	
Good Hope, with illustrative Drawings. By Professor Smyth.	
Communicated by the Secretary,	87
On the Existence of Fluorine in the Bones from Arthur's Seat. By	
Dr G. Wilson,	88
On the Composition of the Bones from Arthur's Seat. By Dr Christison,	88
On the Description of Oval Curves, and those having a plurality of	
Foci. By Mr James Clerk Maxwell; with remarks by Pro-	
fessor Forbes. Communicated by Professor Forbes,	89
On the Influence of Contractions of Muscles on the Circulation of	-
the Blood. By Dr Wardrop,	91
On the Solubility of Fluoride of Calcium in Water, and the relation	•
of this property to the occurrence of that Substance in Minerals,	
and in recent and Fossil Plants and Animals. By Dr G. Wilson,	91
On the Constitution and Properties of Picoline, a new organic base	O, I
• • • • • • • • • • • • • • • • • • •	0.4
from Coal-Tar. By Dr T. Anderson,	94
Notice of Polished and Striated Rocks recently discovered on	
Arthur's Seat, and in some other places near Edinburgh. By	۰.
David Milne, Esq.,	95
Results of the Makerstoun Observations, No. II. On the Relation	
of the Variations of the Vertical Component of the Earth's Mag-	
netic Intensity to the Solar and Lunar Periods. By J. Allan	
Broun, Esq. Communicated by Sir T. M. Brisbane, Bart.,	97
Two Verbal Notices. (1.) On the Geology of Arthur Seat. (2.)	
On the Dentition of the Walrus. By the Rev. Dr Fleming,	98

On the Mean Height of the Barometer in different Latitudes. By	
Professor Hansteen of Christiania. Communicated in a Letter to	
the Secretary,	101
On the Extent to which Fluoride of Calcium is Soluble in Water at	
60° F. By Dr George Wilson,	102
New Observations on the Glaciers of Savoy. Part I. By Professor	
Forbes,	103
New Observations on the Glaciers of Savoy. (Concluded). By Pro-	
fessor Forbes,	107
On General Differentiation. Part III. By the Rev. Professor	
	108
Extracts from a Letter of Baron Berzelius. Communicated by Dr	
T. Anderson,	108
On the presumed long-continued Presence of Arsensic in the	
Human Stomach. By Dr Gregory,	110
Notes on the Superficial Strata of the Neighbourhood of Edinburgh.	
By the Rev. Dr Fleming. (Commenced.)	110
An Attempt to Elucidate and Apply Mr Warren's Doctrine re-	
specting the Square Root of Negative Quantities. By Bishop	
	111
Notes on the Superficial Strata of the Neighbourhood of Edinburgh.	
	111
Speculation respecting the origin of Trap-Tuff, the Cause of Earth-	
quakes, and of Partial Changes of the Bed of the Ocean. Part I.	
	114
- ,	114
Speculation respecting the origin of Trap-Tuff, the Cause of	111
Earthquakes, and of Partial Changes of the Bed of the Ocean.	
<u> </u>	115
	117
On the Co-existence of Ovigerous Capsules and Spermatozoa in the	
same individuals of the Hydra Viridis. By Dr Allen Thomson,	123
On the Parallel Roads of Lochaber; with Remarks on the Change	120
of relative Levels of Sea and Land in Scotland, and on the De-	
trital Deposits in that Country. Part I. By David Milne, Esq.,	194
On the Course of Observation to be pursued in future at the Royal	141
	126
Observations of Terrestrial Temperature made at Trevandrum Ob-	120
servatory, from May 1842 to December 1845. By John Cal-	
decott, Esq. Communicated by Professor Forbes,	127
On the Temperature of Wells and Springs at Trevandrum in India	12:
(Lat. 8° 31', Long. 5 <sup>h</sup> 8 <sup>m</sup> ). By Major-General Cullen, Madras	
Artillery. Communicated in a Letter to Professor Forbes,	<b>12</b> 8
Chemical Notices. By Dr Gregory,	129
Remarks on the Hypothesis of Progressive Development in the Or-	129
ganic Creation. By Sir G. S. Mackenzie, Bart.,	130
On the Parallel Roads of Lochaber; with Remarks on the Change	190
of relative Levels of Sea and Land in Scotland, and on the De-	
A DATE OF A DATE OF THE PARTY O	190
Verbal Communication on Fossils of the Lias Formation, from	132
South Africa. By the Rev. Dr Fleming,	100
	133

On Certain Products of Decomposition of the Fixed Oils in Contact	
	134
On the Structural relation of Oil and Albumen in the Animal Eco-	
nomy. By Dr J. H. Bennett,	136
Experiments on the Ordinary Refraction of Light, by Iceland Spar.	
	139
On the Boulder Formation and Superficial Deposits of Nova Scotia.	
By J. W. Dawson, Esq. Communicated by Dr Gregory,	140
On the Mode of Occurrence of Gypsum in Nova Scotia, and on its	170
	141
Probable Origin. By the Same,	141
On certain Anomalous Deviations of the Transit Instrument at the	<b>1</b> 40
Royal Observatory. By Professor Smyth,	142
Results of Makerstoun Observations, No. III. On the Solar and	
Lunar periods of the Magnetic Declination. By J. A. Broun,	
Esq. Communicated by Sir T. M. Brisbane, Bart.,	144
Notice of Two Ores of Copper, one of them a New Mineral. By	
Professor Connell,	146
Biographical Memoir of the late Dr Hope. By Dr Traill,	148
Note on the Constitution of the Phosphates of the Organic Alkalies.	
By Dr Thomas Anderson,	148
Examination of some Theories of German Writers, and of Mr	
Grote, on the Authorship of the Iliad and Odyssey. By Pro-	
fessor Dunbar,	154
On Algebraical Symbolism. By Bishop Terrot,	156
Account of a Geological Examination of the Volcanoes of the Vi-	100
	1 50
varais. By Professor Forbes,	158
Geological Notices. By the Rev. Dr Fleming,	159
Verbal Notice. By the Rev. Dr Fleming,	159
On the Preparation of Kreatine, and on the Amount of it in the	
Flesh of different Animals. By Dr Gregory,	160
Notices of a Flood at Frastänz, in the Vorarlberg, in the Autumn	
of 1846. By William Brown, Esq	162
Contributions to the Phenomena of the Zodiacal Light. By Pro-	
fessor Smyth,	162
Practical Illustration of the Adjustments of the Equatorial Instru-	
ment. By Professor Smyth,	164
On the Vertebral Column, and some Characters that have been	
overlooked in the Descriptions both of the Anatomist and Zoolo-	
gist. By Dr Macdonald,	166
On the Theory of the Parallel Roads of Lochaber. By James	100
Thomson, Esq., jun., Glasgow. Communicated by Professor	
	1/7/0
Forbes,	170
On an Instrument for measuring the extensibility of Elastic Solids.	<b>4</b> ha c
By Professor Forbes,	173
On the Anthracite of the Calton Hill. By the Rev. Dr Fleming,	175
On some Phenomena of Capillary Attraction observed with Chloro-	
form, Bisulphuret of Carbon, and other Liquids. By Dr George	
Wilson,	176
Notice of the Orbit of the Binary Star a Centauri, as recently	
determined by Captain W. S. Jacob, Bombay Engineers. By	
Professor Smyth,	178

On the Colouring Matter of the Morinda citrifolia. By Dr Thomas	
Anderson,	179
An attempt to Improve the present Methods of determining the	
Strength and Direction of the Wind at Sea. By Professor Smyth,	180
On the Action of the Dry Gases on Organic Colouring Matters,	
and its relation to the Theory of Bleaching. By Dr George	
Wilson,	183
On the Products of the Destructive Distillation of Animal Sub-	100
stances. Part I. By Dr Thomas Anderson,	186
	100
Note respecting the Refractive and Dispersive Power of Chloro-	187
form. By Professor Forbes,	101
Geological Notes on the Valleys of the Rhine and Rhone. By	100
Robert Chambers, Esq.,	189
On the Classification of Colours. By Professor Forbes,	190
Description of a Mud-slide at Malta. By A. Milward, Esq. Com-	_
municated by the Secretary,	195
An attempt to explain the "Dirt-bands" of Glaciers. By A. Mil-	
ward, Esq.,	195
On the rate of Progression of the Himalayan Glaciers. By Lieu-	
tenant R. Strachey, Bengal Engineers,	196
Observations on the preceding Communications, and especially on	
the Cause of the Annual Rings of Glaciers. By Professor Forbes,	196
An Account of Carnot's Theory of the Motive Power of Heat, with	
Numerical Results deduced from Regnault's Experiments on	
Steam. By Professor William Thomson of Glasgow, .	198
Theoretical Considerations on the Effect of Pressure in Lowering	100
the Freezing-Point of Water. By James Thomson, Esq., jun.,	
Glasgow. Communicated by Professor W. Thomson,	204
On the Early History of the Air-Pump in England. By Dr George	20±
• • • • • • • • • • • • • • • • • • • •	207
On the Classification of Colours. Part II. By Professor Forbes.	201
	014
	214
Verbal Notice of Silicious Stalactites on Arthur's Seat. By the	010
0,	216
On some peculiar Impressions on the Surface of certain Strata of	
Greywack Schist, at Goldielands, in Roxburghshire. By James	
	217
On the Causes of Local Peculiarities of Temperature in different	
parts of Great Britain. By James Elliot. Communicated by	
	<b>2</b> 18
	219
Notice by Professor Smyth of Locke's Electric Observing Clock,	220
Abstract of a Communication on Rolling Curves,	<b>222</b>
On the Extraction of Mannite from the Dandelion. By Messrs	
Smith; with an Analysis of the Mannite by Dr Stenhouse. Com-	
	223
On some new Voltaic Arrangements with Chlorous and Chromic	
Acids, with an Account of a Battery, yielding electricity of great	
intensity, in which the negative as well as the positive element	
is Zinc. By Dr Thomas Wright. Communicated by Dr G.	
****	0.02
11 12UU11, + + + + + + + + + + + + + + + + + +	223

Biographical Notice of Dr Chalmers. By the Very Rev. E. B.	
T)	226
An Attempt to compare the Exact and Popular Estimates of Pro-	
	228
On the Gradual Production of Luminous Impressions on the Eye,	
and other phenomena of Vision. By William Swan, Esq.,	230
Note on the Refractive and Dispersive Powers of the Humours of	
	232
On Grooved and Striated Rocks in the Middle Region of Scot-	
	233
1	234
On a Method of Cooling the Atmosphere of Rooms in a Tropical	~ <b>~</b> ~
	235
	236
A few Unpublished Particulars concerning the late Dr Black. By	000
, ,	238
On a New Voltaic Battery of Intense Power. By Dr Wright.	ഹെ
, , , , , , , , , , , , , , , , , , ,	239
On a New Species of Manna, from New South Wales. By Dr	239
,	200
Account of a Peculiar Structure found in the Vagmarus Islandicus. By Dr John Reid. Communicated by Professor Goodsir, .	241
Notes to a Paper on the Motive Power of Heat. By Professor	<i>4</i> T I
	241
Note regarding an Experiment suggested by Professor Robison.	<b>2</b> 11
By Professor Forbes,	244
Personal Observations on Terraces, and other Proofs of Changes	
in the relative Level of Sea and Land in Scandinavia. By	
Robert Chambers, Esq.,	247
Note respecting the Dimensions and Refracting Power of the Eye.	
By Professor Forbes,	<b>2</b> 51
On the Intensity of Heat reflected from Glass. By Professor Forbes,	256
On the Solution of certain Differential Equations. By Professor	
Kelland,	257
On the Muscular Substance of the Tongue. By Mr Zaglus. Com-	
municated by Professor Goodsir,	258
On the Volcanic Formations of the Alban Hills, near Rome. By	
Professor Forbes,	259
On the Gamboge Tree of Siam. By Dr Christison,	263
Notice respecting a Deposit of Shells near Borrowstounness. By	
Charles Maclaren, Esq.,	265
An Account of some Monstrosities. By the late Dr J. Reid. Com-	
municated by Professor Goodsir,	267
The Effect of Pressure in Lowering the Freezing-Point of Water	
experimentally demonstrated. By Prof. W. Thomson, Glasgow,	267
On the Extinction of Light in the Atmosphere. By W. S. Jacob,	
Esq., H.E.I.C. Astronomer, Madras. Communicated by Pro-	
fessor Smyth,	27]
Abstract of a Paper on the Hypothesis of Molecular Vortices, and	
its Application to the Mechanical Theory of Heat. By W. J. M.	<b>~ 1−</b> :
Rankine, Esq., Civil Engineer,	27!

On Probable Inference. By Bishop Terrot,	288
On the Ante-Columbian Discovery of America. By Dr Elton. Communicated by Dr Traill,	291
On the Equilibrium of Elastic Solids. By Mr James Clerk Maxwell.	
Communicated by the Secretary,	294
Two Letters from W. E. Logan, Esq., to Earl Cathcart,	296
Notes on Practical Chemical Subjects. By Alexander Kemp, Esq.	
Communicated by Dr Gregory,	<b>29</b> 8
Analysis of the Anthracite of the Calton Hill, Edinburgh. By Dr	
A. Voelcker. Communicated by Dr George Wilson,	300
On the Proportion of Fluoride of Calcium present in the Baltic.	000
By Professor Forchammer of Copenhagen. With some Prelimi-	
nary Remarks on the presence of Fluorine in different Ocean	
Waters. By Dr George Wilson,	302
On an Application of the Laws of Numerical Harmonic Ratio to	002
Forms generally, and particularly to that of the Human Figure.	
By D. R. Hay, Esq.,	304
Note regarding the American Electric-Observing Clocks. By Pro-	OUI
	309
Account of a Remarkable Meteor, seen 19th December 1849. By	000
· · · · · · · · · · · · · · · · · · ·	309
Notes on the Purification and Properties of Chloroform. By	000
	316
On a Peruvian Musical Instrument, like the ancient Syrinx. By	010
	325
·	326
Abstract of Professor Kelland's Exposition of the Views of D. R.	020
••••••••••••••••••••••••••••••••••••••	328
On the Constitution of Codeine, and its Products of Decomposition.	020
	330
On the Physical and Scottish Statutory Limits of Sea and River,	000
	333
On the Combined Motions of the Magnetic Needle, and on the	000
Aurora Borealis. By J. A. Broun, Esq. Communicated by Sir	
	334
ar and an arrange arms of the second	UUT