The Silurian rocks of Britain, Vol 1 Scotland

Memoirs of the Geological Survey of the United Kingdom

(Front cover) Front cover. Silurian rocks of Britain. Volume 1. Scotland.

(Title page) Title page. Silurian rocks of Britain. Volume 1. Scotland.

(Map 1) Index map of the Silurian rocks of south Scotland.

Contents

By B. N. Peach and with Petrological chapters and notes by J. J. H. Teall

Chapter 1 Physical features of the Silurian region of Scotland

Chapter 2 History of previous researches among the Silurian rocks of the south of Scotland

Researches of Hutton, Hall, MacLaren, Carrick Moore

Researches of Nicol, Hay Cunningham, Harkness, Salter

Researches of Sedgwick, Murchison

Researches of Harkness, Slimon, Murchison, Carrick Moore

Researches of Geological Survey prior to 1868

Researches of Henderson, Brown, Haswell, Davidson

Researches of Geological Survey 1868–1887

Researches of Lapworth

Researches of Geological Survey 1888-96 (Dr. Hinde)

Chapter 3 General description of the Silurian rocks of the Southern Uplands.

I Stratigraphy:

Geographical Sub-divisions of the Tableland (Southern, Central, and Northern Belts, Girvan Area)

Arenig — Rocks, Fossils, Conditions of Deposition

Llandeilo

Caradoc

Llandovery and Tarannon

Wenlock and Ludlow

Downtonian

Il Tectonic arrangement of the strata:

Period of Elevation of Tableland; Isolation of Sub-formations by Denudation

Types of Curvature

Structural Features of the Silurian Belts

Modification of Outcrop by Pitch of Folds; Schistosity and Cleavage

Intrusive Igneous Rocks earlier than the Upper Old Red Sandstone

Contact Metamorphism; Excavation of the Valley System

Table showing relative thicknesses of Silurian strata in South of Scotland

Table showing sub-divisions and thicknesses of Upper Silurian strata

Table showing sub-divisions and thicknesses of Lower Silurian strata

Chapter 4 Petrography of the igneous rocks in the lower Silurian formations in the Southern Uplands

By J. J. H. Teall, F.R.S.

Lavas (diabase and "diabase-porphyrite") and tuffs

Soda-felsite lava, Peeblesshire

Perlitic felsite lava

Serpentine, Gabbro, Dolerite, &c.

Chapter 5 Detailed description of the Silurian region of the Southern Uplands

I. The Central Belt.

The Moffat Black Shale Series (typical sections):

Dobb's Linn, Moffatdale

Craigmichan Scaurs, Moffatdale

<u>Chapter 6 The Central Belt — The Moffat Series (continued).</u>

Black Shale Bands south of Moffatdale:

- 1. Band of Bodesbeck Summit, Range Cleuch, Muckra, and Crosscleuch to St. Mary's Loch
- 2. Band of Thirlstane Score
- 3. Band from Pot Law by Peniestone Knowe to Moory Sike
- 4. Band from Brockhope Burn by Whitehope and Berryknowe to Eldinhope, Vale of Yarrow
- 5. Mountbenger Band
- 6. Band from Bellcraig by Craigmichan Scaurs, Entertrona, the Upper Ettrick, to Berrybush
- 7. Shorthope and Phawhope, Upper Ettrick
- 8. Ettrickbridge-end section

Chapter 7 The Central Belt — The Moffat Series (continued).

Frenchland Burn, Garpol Water, &c.

Hartfell section
Rottonside, Headshaw Linn, &c.
Mid Craig, Loch Skene, &c.
Glengaber Burn, Douglas Burn, &c.
Fruid Water, Tweed Valley
Summary of the evidence regarding modification of the Moffat Zones between Dobb's Linn and northern margin of Tarannon Area (Sheet 16 of Map)
Chapter 8. The Central Belt — The Moffat Series (continued).
Black Shale Bands in the area between the Annan and the Nith
The Glenkiln section
Duffkinnel Water,
District of Wee Queensberry Hill
Crook Burn, Daer Water
Black Shale Bands in the area between Nithsdale and the River Cree
Bogrie and Castramon, &c.
Water of Urr
Barend and Auchenvey, &c.
Glen Burn and Skeoch
Trowdale, Crossmichael, and Lawrieston
River Cree, one mile north of Newton-Stewart
Chapter 9. The Central Belt — The Moffat Series (continued).
Black Shale Bands between the Cree and the Mull of Galloway:
Glenling, Crailloch, and Ballaird Black Shale Bands
Culroy Band
Clanyard Bay, Drumbreddan Bay, &c.
Summary of the evidence regarding the Moffat Series, on the shore between the Mull of Galloway and Money Head (Sheets 1 and 3 of Map)
<u>Chapter 10 The Central belt — The Moffat Series (continued). Black shale bands east of Peebles and Selkirk</u>
Rhymer's Glen, Melrose, Coldshiels Loch, &c. Leithen Water, Lugate Water, Garnscleuch Burn, &c.

Chapter 11. The Central Belt (continued). Tarannon Rocks

Northern Base-line of Liandovery Rocks of the Central Belt
North-Eastern District
Moffat District
District between the Nith and the Cree
District west of the Cree
<u>Chapter 12 The Northern Belt. Arenig, Llandeilo, and Caradoc Formations in the district between Abington and Eddleston</u>
Basin of the Wandel Water
Abington District east of the Clyde
Culter Water District
Biggar Water District
District stretching from the basins of the Tarth and Lyne Waters to the Midlothian Coal-field
Eddleston and Drochil Castle District, &c.
Chapter 13 The Northern Belt (continued). Arenig, Llandeilo, and Caradoc Formations in the district between Wrae, Peeblesshire, and the Lammermuir Hills
Volcanic and Sedimentary Rocks of Wrae, Glencotho,
Drummelzier, Hamilton Hill, and Winkston
Stobo Slate Quarries, &c.
Head Waters of the Leithen, &c.
Basin of the Heriot Water
Gala Water, Leader Water Basin
Kelphope Burn, Friar's Nose
Lammermuir Hills
Chapter 14 The Northern Belt (continued). Arenig, Llandeilo, and Caradoc rocks in the Leadhills district
Glengonner Water and its tributaries, including Bellgill Burn, Kirk Burn, Raven Gill, Glencaple Burn, &c.
Wanlock Water and tributaries, including Glengaber Burn, Back Burn, Duntercleuch Burn, Glenmarch-Hope Burn, and Sowen Burn
Snar Water near Wanlockhead, and tributaries
Cog Burn and its tributaries (west from Wanlockhead) Conrig Burn, Fingland Burn Conrig Hill, Glendyne Burn
Chapter 15 The Northern Belt (continued). Arenig, Llandeilo, and Caradoc Formations of the Leadhills district

(continued)

Bail Hill Volcanic Area

Basin of the Crawick Water, including Kiln, Polcraig, Spotfore, Back, and Polthistly Burns, Eller Scaur, Wanlock Water (lower section), Glennrae Burn, Nether Whitecleuch Burn

Basin of the Duneaton Water (southern portion), including Snar Water (lower section), Glentewing Burn, Glenliscleuch Burn

Fossiliferous Conglomerate of Duntercleuch and Glendowran, Leadhills

Representatives of Glenkiln Shales and associated sediments, from the Sanquhar Coal-field to the Clyde near Wandel Mill

Black Shale Bands in the basins of the Elvan and Menock Waters, and in the Tributaries of the Nith near Kirkbride

<u>Chapter 16 The Northern Belt (continued) Arenig, Llandeilo, and Caradoc formations between Nithsdale and Loch Doon</u>

- 1. Black Shale Bands between Burnmouth, Nithedale, and Dalshangan north of Dalry
- 2. Black Shale Bands between Upper Appin, Shinnel Water, and Arndarroch, River Ken
- 3. Black Shale Bands from Corfardine, Scar Water, by Clodderoch and Margree to Gordonston near Dalry
- 4. Black Shale Bands between Whing Burn, Euchan Water, and Benniner Hill, near Cairnsmore of Carsphairn

Band of Volcanic Rocks between the Bello and Euchan Waters (Caradoc)

<u>Chapter 17. The Northern Belt (continued). Arenig, Llandeilo, and Caradoc formations between Nithsdale and Loch Doon (continued)</u>

Volcanic Area two miles E.S.E. of New Cumnock Glenkiln-Hartfell Shales in Polmorlach and Polhote Burns

Dalmellington District

Carsphairn District

Sediments mainly of Caradoc age overlying the Glenkiln-Harden Black Shales between the Nith and Loch Doon Granite mass

<u>Chapter 18 The Northern Belt (continued). Arenig, Llandeilo, and Caradoc formations between the Merrick Hills</u> and the Portpatrick coast-line

- i. Black Shale Bands between Lamachan, Loch Dee, and Dunragit near Glenluce
- ii. Black Shale Bands between Glen Trool and New Luce 3 Black Shale Bands of Morroch Bay, Colfin, and Garthland, in Portpatrick District

Shore Section from Corsewall Lighthouse to Portpatrick

Cairn Ryan District

Craiglure Lodge, north-west of Loch Doon

Sediments of Caradoc age overlying the Glenkiln–Hartfell Shales to the north of the Llandovery Area in Wigtownshire, and the western part of Kirkcudbrightshire

Chapter 19 III. The Girvan District. Arenig-Llandeilo Volcanic Series of Ballantrae and associated sediments

Area between Glen App and Ballantrae

Portandea section

Glen Currarie, Shallochbraik Burn, and Brakness Hole

Shore section between Currarie and Downan Point

Area between the valley of the Stinchar and Byne Hill

Bennane Head, shore section

Coast section from Bennane Head to Balcreuchan Port

Summary of the evidence regarding the typical Bennane Head section

Pinbain Shore section

Pinbain to Kennedy's Pass, shore section

Mains Hill, Ballantrae, and Balnowlart

Knockdolian Hill, Ballantrae

Inland Volcanic Area south of Stinchar

Central Volcanic Area between Bennane Head and Lochton

Northern Inland Volcanic Area, including Pinbain Hill

Small inliers of Arenig Volcanic rocks near the main volcanic area of Ballantrae

Chapter 20 The Girvan District (continued). Intrusive igneous rocks

Serpentine, Gabbro, Dolerite, Epidiorite, Granite

Chapter 21 The Girvan District (continued). Llandeilo-Caradoc Sedimentary (Girvan) Series

The Barr Series (Upper Llandeilo)

Sub-divisions of the Barr Series

Sections in the valley of the Stinchar near Barr, Benan Burn, Minuntion Quarry, Dularg

Sections in the Assel Valley

Sections round the margin of Arenig Volcanic Plateau, showing unconformability at base of Girvan Series — Aldons, Millenderdale, Byne Hill, and Kennedy's Pass

Inliers of the Barr Series in the Volcanic Plateau — Craigneil Castle, Bougang, Knockdolian Barns Additional exposures south of the Girvan Valley — Dinvin Hill, Pinmacher, Glendrissock Hill, Trowier Hill, Dow Hill

Sections north of the Girvan Valley — Craighead Quarries, Thunderton, and Glenlocbrie

Geological Horizon of the Barr Series — Summary of the evidence regarding the local elevation of the Arenig Volcanic Rocks, &c.

Caradoc Formation

Generalised Section of the Caradoc strata

- i. Balclatchie Group: Sections Balclatchie Bridge, Barbae, Daldowie, Millenderdale, Laggan Gill, Ardmillan Braes
- ii. Ardwell Group, iii. Whitehouse Group, iv. Barren Flagstone Group, exposed on Ardmillan Shore and in Penwhapple Glen

Caradoc Strata of the Craighead Inlier

iv. Barren Flagstone Group, v. Drummuck Group

Chapter 22 The Girvan District (continued) — Upper Silurian

i. Llandovery

Sub-divisions of the Llandovery Rocks

- 1. 1 Craighead Inlier
- 2. 2. District of Penwhapple Glen, Saugh Hill, and Camregan
- 3. 3. Sections east of Penwhapple Glen
- 4. 4. Sections west of Penwhapple Glen
- 5. 5. Shalloch and Woodland, south of Girvan

ii. Tarannon

Sub-divisions of Tarannon Series

(a) Penkill Group, (b) Bargany Group, (c) Drumyork Flagstones

iii. Wenlock

Blair, Knockgardner, and Straiton Beds

Chapter 23 IV. The Southern Belt. Wenlock and Ludlow

- 1. Burrow Head, Wigtownshire
- 2. District between the Dee and the Nith
- 3. District between Dumfries and Langholm
- 4. District between Langholm and the River Jed
- 5. Inlier of Riccarton and Wolfelee
- 6. Inliers on the northern slopes of the Cheviot Hills

Chapter 24. V. Upper Silurian rocks north of The Tableland. Lanarkshire and Ayrshire

Recent discoveries of organic remains in Silurian Rocks

Note by Dr. Traquair on the Fish Fauna

Reasons why the Downtonian Rocks are now classed with the Silurian System

Classification of the Upper Silurian Rocks in Lanarkshire

1. The Lesmahagow Inlier

- 2. The Anticline of the Hagshaw Hills
- 3. The Carmichael Burn Inlier
- 4. The small exposure south of Tinto

Chapter 25 Upper Silurian rocks north of The Tableland (continued) The Pentland Hills

- Inlier extending from the Lyne Water by the North Esk to Green Law. Sections in the North Esk and Lyne Water. Note by Mr. Malcolm Laurie on the Arthropoda of the Gutterford Burn. Summary of the evidence regarding this Silurian Inlier
- 2. Habbie's Howe Inlier
- 3. Bavelaw Castle Inlier
- 4. Craigenterrie Inlier

Chapter 26 Granite masses, dykes

By J. J. H. Teall, F.R.S.

Granite masses

- 1. Criffel and Dalbeattie Mass
- 2. Loch Dee Mass
- 3. Cairnsmore of Fleet Mass

Summary of the principal results obtained from the petrographical study of the Galloway Granites

Dykes

1. Porphyrites, 2. Diorites, 3. Mica-traps

Chapter 27 Contact metamorphism round the Galloway granites

By J. J. H. Teall, F.R.S.

Minerals present in the altered rocks

Altered sedimentary rocks

Altered igneous rocks

Chapter 28 Economic products of the Silurian Rocks of the South of Scotland

Appendix

Appendix I. Lists of fossils from the Silurian rocks of the South of Scotland:

- 1. General List of the Graptolites from the Silurian Rocks of the South of Scotland
- 2. General List of Fossils, exclusive of Graptolites, from the Silurian Rocks of the South of Scotland, in the Collections of the Geological Survey
- 3. List of Fossils, prepared by Mrs. Gray, from the Collection made by her from the Silurian Rocks of the Girvan District of the South of Scotland
- 4. Complete List of Fossils from the kitinchar Limestone Series (Upper Llandeilo) of the Girvan District of the South of Scotland

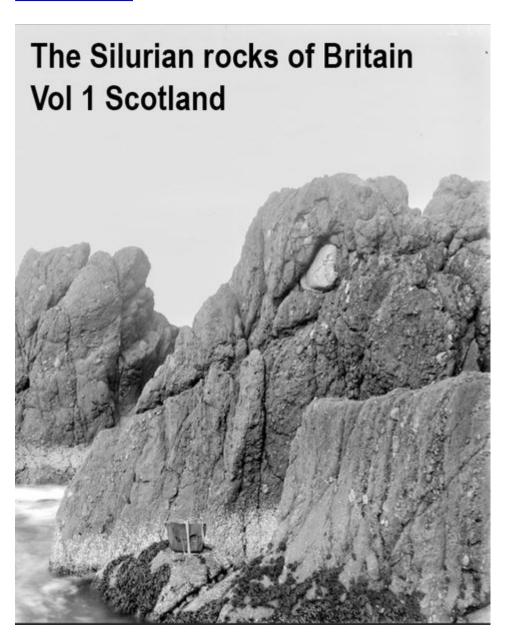
- 5. Comparative Table of Fossils from the Caradoc Rocks of Balclatchie, Leadhills, Wallace's Cast, Kilbucho, Glencotho, Wrae, and Winkston
- 6. Comparative Table of Fossils from the Wenlock-Ludlow Rocks of the South of Scotland

Appendix II. List of works referring to the geology of the Silurian rocks of the South of Scotland

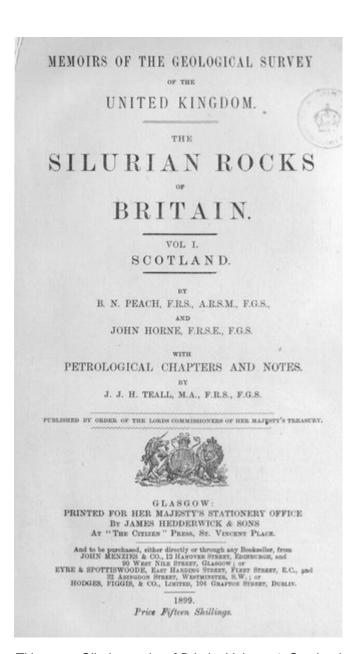
Index

Plates at end of volume (see under List of Illustrations),

Figures and plates



Front cover. Silurian rocks of Britain. Volume 1. Scotland.



Title page. Silurian rocks of Britain. Volume 1. Scotland.

