VIII. CONCLUSION.—It is apparent, from what I have said, that there are abundant supplies of coal on the North Pacific, sufficient, if properly developed, for the supply of the railroads and steamers, which are yearly on the increase; but that the only coal fitted for steaming purposes is found in the British possessions, all others being of tertiary age, and very inferior in quality. In these coal-fields British Columbia has within itself the elements of lasting prosperity, which, if properly managed, might be the means of raising the colony from its present state of commercial depression to a condition the reverse of this. The high rates of labour will, however, long act as a deterrent to the full development of the mineral riches of the coast, but this obstacle is gradually lessening in magnitude. It is not the province of this paper to enter upon the discussion of what expense would be incurred in opening up these mines,—even did its limits admit of such a digression.

III. *Notes on the Trap-Dykes of Edinburgh and Neighbourhood.*
By GEORGE LYON.

(*Abstract.*)

The igneous rocks in and around Edinburgh have been faithfully and accurately described by many geologists. Good service was rendered in this work by our late President, Mr Charles Maclaren, at a time when these rocks were more keenly studied than they are at present. Their study has been now very much superseded by the more interesting and attractive pursuit of palæontology.

Mr Maclaren, in the original edition of his work on “The Geology of Fife and the Lothians,” enumerates nine localities where trap-dykes occur in Edinburgh; and in the second edition of that book, three additional localities are mentioned.* Over and above those described by Mr Maclaren, I have succeeded in adding other ten localities where the trap has been discovered, and which have hitherto escaped notice and description. Their general average direction bears *north-west* and *south-east*, and across the strike of the strata. Some geological writers have referred the occurrence of these trap-dykes and veins to one common centre of volcanic disturbance in the district, but I cannot support this idea, which I imagine to be more fanciful than real. The evidence goes to show that these dykes generally run parallel to each other, and are connected, it may be, with lines of fault.

Trap-dykes are extravasated portions of igneous fluid matter, which has been injected into the fissures of the rocks, filling up

* Geology of Fife and the Lothians, second edition, top of page 81.

all cracks and rents, and that at a period towards the close, apparently, of the Carboniferous era.

For the information of those who may be interested in this subject, I subjoin the following lists of the trap-dykes of Edinburgh and neighbourhood, so far as these are known at the present time:—

1. *List of Trap-Dykes in Edinburgh.*

1. *Drummond Place and Broughton Place.*—This is a large dyke of greenstone, sixty feet broad, running from Drummond Place to Broughton Place, thence eastwards towards Lochend. It can be traced seaward. This dyke was admirably seen when the foundations were being cleared for St Mary's Church, Albany Street. Direction, north-west by south-east.

2. *Lothian Street.*—Two thin dykes occur here—one opposite the shops Nos. 2 and 4; the other at the corner of the Potterrow.

3. *Merchant Street.*—A vein was exposed while digging the foundations of George IV. Bridge.

4. *South Back of Canongate.*—At Berwick's Brewery a bed of trap exists three feet thick. Mr Maclaren considers this to be a continuation of the St Leonard's bed, 1000 feet south of this spot.*

5. *Bell's Mills and Stockbridge.*—A large mass of intrusive trap is to be seen at Bell's Mills, close to the bridge over the Water of Leith. Its position is between the shale and sandstone, and dips to the north-west. A dyke was seen at Allan Street, Stockbridge, which is in all likelihood a continuation of the trap at Bell's Mills.

6. *Water of Leith and St Bernard's Well.*—A dyke occurs in the bed of the stream, which Williams says may be more properly called a "slip-dyke," it being upon the line of a fault.† Two veins, one twelve and the other six feet broad, are seen at St Bernard's Well. Their direction is west-north-west by south-east.

7. *Bread Street and Corner of Grindlay Street.*—A bed is seen here. In its upheaval it has thrown the sandstone into confusion. This bed, though still exposed, will shortly be quarried out for the foundations of the houses of Grindlay Street.

8. *Lauriston.*—A dyke exists in Lauriston between Watson's and Heriot's Hospitals, and was observed by Mr Jardine while tunnelling between these houses.

9. *Canonmills Village.*—A dyke was found on the east side of this village, and another upon Eyre's ground, to the west.

* Geology of Fife and the Lothians, second edition, page 80.

† Williams' Mineral Kingdom, second edition, vol. i. p. 46.

10. *Fountainbridge*.—A *dyke* was discovered at the North British Rubber Works by Dr Page, with a direction of north-west and south-east.

11. *South Hanover Street*.—A large *dyke* was seen here some years ago, when the main drain of Hanover Street was being sunk. The upheaval of the trap has thrown the sandstones into a complete anticline immediately under the present City of Glasgow Bank at No. 14 of the street.*

12. *Nicolson Street and Simon Square*.—A broad *dyke* of porphyritic greenstone has been noted here.

13. *Foot of Pleasance*.—A *dyke* runs from the foot of the Pleasance to Drummond Street, crossing Richmond Place to Simon's Square, and thence to Haddon's Court.

14. *St John's Hill*.—A *vein* at this place, close to Mr Ritchie's brewery.

15. *St Leonard Street*.—A *dyke* from ten to twelve feet broad was seen a short distance to the south of the present gate into the railway station.

16. *Buccleuch Street*.—A *bedded porphyritic greenstone* occurs opposite the Archer's Hall.

17. *Brown's Close*.—At this close, No. 70 Canongate, at the northern side, a *dyke* runs due north and south. It is composed of greenstone porphyry, and is not unlikely to be a continuation of the porphyritic greenstone of the Calton Hill.

18. *Fountain Close*.—A *vein* opposite John Knox's House at the Netherbow, and the opening into this close.

19. *Little King Street*.—At the top of this street, in St James' Street and Square,† according to Mr Rhind, the houses are built upon a foundation of trap‡—probably an *upheaval*.

Note.—Nos. 1 to 9 inclusive in this list have been previously observed and noted by Mr Maclaren, and are repeated here, with some additional observations of my own, in order that the present list may be rendered as complete as possible. A map of the city, upon which the *Trap* localities have been carefully marked and laid down, has been deposited by me in the library of the Society, where it may be seen and consulted.

2. *List of Trap-Dykes in the Neighbourhood of Edinburgh, some of which are already well known to the local Student of Geology.*

1. *Calton Hill and Castle Rock*.—Numerous *beds* and *dykes* occur in these hills.

* For description of this interesting anticline see Mr G. C. Haswell's paper upon the "Lower Carboniferous Rocks at Hanover Street," pp. 13 and 14 of this volume.

† This square is built upon the "*Bunker's Hill*" of former days.

‡ See Rhind's "Excursions Illustrative of the Geology and Natural History of the Environs of Edinburgh," 2d ed., 1836, p. 27.

2. *Arthur Seat*.—At Salisbury Crags two *dykes* cut through the greenstone of the cliff, one of which is situated at the Cat-Nick; and the other a little to the north of it. At the rifle range, Hunter's Bog, a small *vein* strikes through the ridge above the powder magazine at the butts.

3. *Hawkhill*.—Two *beds* of greenstone make their appearance at this place—one of a coarse, the other of a fine-grained texture.

4. *Lochend*.—A *cliff* of greenstone appears at Lochend, which is supposed to have a connection with the greenstone of Whinny Hill, Arthur's Seat.

5. *Shore from Granton to Cramond*.—Numerous *dykes* are visible along the shore between these two places.

6. *Prestonpans*.—A large *dyke* runs for seven miles at this village, and is conjectured to be a continuation of the greenstone outburst of Lochend and Whinny Hill, above referred to.

7. *Niddry*.—A *dyke*, commencing at Brunstane House, runs east and west at this point.

Thursday, 6th May 1869.

ARCHIBALD GEIKIE, Esq., F.R.S., President of the Society, in the Chair.

The following Gentleman was elected an Ordinary Fellow of the Society :—

JAMES COLSTON, Printer, Edinburgh.

Presentation of Mr Falkner's Portrait.—Mr GEORGE LYON requested the Society to accept a large photograph portrait of Mr Falkner, a former president of the Society, Mr Falkner having, at the earnest solicitation of some of his friends, agreed to present the Society with this memento of his connection with it. The portrait, which bears the following inscription—"JAMES PEDDIE FALKNER, Solicitor before the Supreme Courts of Scotland, President of the Edinburgh Geological Society, session 1862-63"—was accepted by the Society, and their thanks were ordered to be conveyed to Mr Falkner for the gift.

A Photograph of a specimen of contorted Clay Slate, with quartzose bands, from Braemar, was exhibited by DANIEL ROSS, Rock Villa, Murrayfield.