



President:—JOHN W. EVANS, LL.B., D.Sc., F.G.S.

LONG EXCURSION TO EDINBURGH.

August 1st to 9th, 1913.

DIRECTORS :—J. S. FLETT, D.Sc., LL.D., F.R.S. ; B. N. PEACH, LL.D., F.R.S. ;
W. F. P. MCINTOCK, M.A., B.Sc. ; R. CAMPBELL, M.A., D.Sc. ; W. T.
GORDON, M.A., D.Sc. ; C. T. CLOUGH, M.A. ; and A. MACCONOCHIE.

EXCURSION SECRETARY : Miss G. M. BAUER, 16, Selborne Road, Handsworth
Wood, Birmingham.

HOTEL ARRANGEMENTS :—Headquarters : The Adelphi Hotel, Cockburn Street.
Terms, 7s. 6d. per day, for bed, attendance, breakfast, sandwiches, and dinner. Other
hotels close by are : The Cathedral Hotel, Cockburn Street, 6s. 6d. per day ; The
Palace Hotel, Princes Street, 8s. per day, sandwiches 1s. extra ; The Carlton Hotel,
North Bridge, 10s. per day. All the hotels are near Waverley Station.

¶ Members should write direct to the hotel selected to engage rooms, stating that
they belong to the Geologists' Association party, and also inform Miss Bauer,
enclosing stamped addressed envelope for acknowledgment. Early application is
strongly advised, as Edinburgh is very full in August.

RAILWAY ARRANGEMENTS :—In consequence of the new arrangements for
obtaining individual tickets (see p. 7), no special party tickets will be taken.
Members can obtain the necessary vouchers from Miss Bauer, and it is advisable to
present them at the local booking office a few days in advance.

The official train from London will be the 9.30 a.m. from St. Pancras (Midland),
due Edinburgh (Waverley Station) 6.10 p.m. Luncheon and Tea cars on train.
The special return fare from London will be £2 3s. 7d. All the lines issue long-
period excursion tickets by trains leaving London on Friday nights.

A special pamphlet for this Excursion has been prepared by the Directors. It is
now in the press, and copies can be ordered of the Excursion Secretary. Price to
members, 1s. 2d., post free.

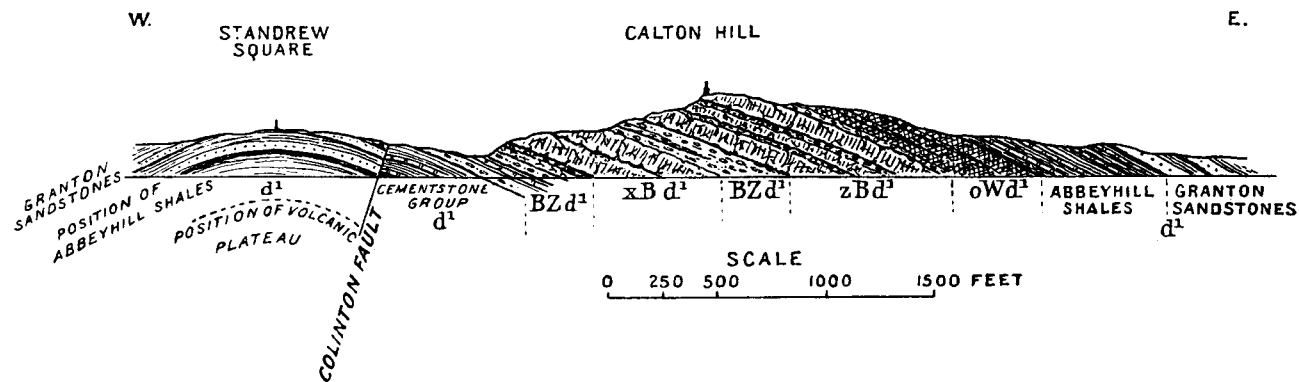


FIG. I.—SECTION ACROSS THE CALTON HILL, EDINBURGH.

(From "The Geology of the Neighbourhood of Edinburgh." *Mem. Geol. Surv.*, 1910, p. 73. Reproduced by permission of H.M. Stationery Office.)

Saturday, August 2nd.—ARTHUR'S SEAT AND PORTOBELLO.

DIRECTOR : B. N. PEACH, LL.D., F.R.S.

Breakfast 8 a.m. Leave hotel 9.30 a.m.

The party will first examine the fine intrusive sill of Salisbury Craigs and note the contact alteration which it has produced, both in the rocks below and those above it. It lies almost at the junction of the Old Red Sandstone and the Carboniferous. Proceeding thence to the Dry Dam we shall inspect the interbedded lavas and ashes of the Whinny Hill Series. Thereafter the outlines of the composite neck which forms Arthur's Seat will be traced, and ascending to the summit of the hill we shall see the intrusive column of basalt that produces the Lion's Head. The Lion's Haunch, and Dunsapie, which are also intrusions of basalt in the neck, will be visited, and the magnificent section of coarse agglomerate that forms the cliff above the Queen's Drive. In this ash there are flows or injections of "brecciated basalt." After inspecting Sampson's Ribs we shall proceed to Portobello, where the raised beaches of the Forth are well displayed.

Tea if desired at Portobello. Tram from Portobello or Leith as arranged.

Walking distance six or seven miles.

Dinner 7 p.m.

Monday, August 4th.—EDINBURGH, CALTON HILL, BRAID HILLS.

DIRECTOR : W. F. P. McLINTOCK, M.A., B.Sc.

Breakfast 8 a.m. Leave hotel 9.30 a.m.

In order to see the models of the geology of Arthur's Seat, and of Edinburgh, we shall proceed to the Royal Scottish Museum in Chambers Street, where also the Geological Survey's collections are exhibited. Then proceeding by the Grassmarket we shall inspect the base of the Castle Rock and the junction with the sandstones on the north side. The glacial hollow of Princes Street Gardens will next be traversed, and thereafter we shall go to the Calton Hill to inspect the fine sections of Lower Carboniferous lavas and ash beds. Tram will then be taken to Morningside, where, after passing over the Upper Old Red Sandstone, we arrive at the lava-flow of Blackford Hill, which is of Lower Old Red Sandstone age. Very fine glacial striæ are to be observed on this hill. Next ascending to the Braid Hills by the footpath, we shall see the trachyte of that locality, and pass on to Comiston Sand-pit to visit a very extraordinary erratic of andesite resting on glacial sands and gravels.

Tram from Calton Hill to Morningside.

Tram from Comiston to Princes Street in the evening.

Dinner 7 p.m.

Tuesday, August 5th.—THE PENTLAND HILLS.

DIRECTOR : R. CAMPBELL, M.A., D.Sc.

Breakfast 8 a.m.

Train to Balerno (6d.), leaving Princes Street Station about 9.26 a.m. From Balerno we shall walk over the Lower Carboniferous rocks to Bavelaw, and after crossing the Upper Old Red Sandstone for a space we shall see the Wenlock rocks that are the

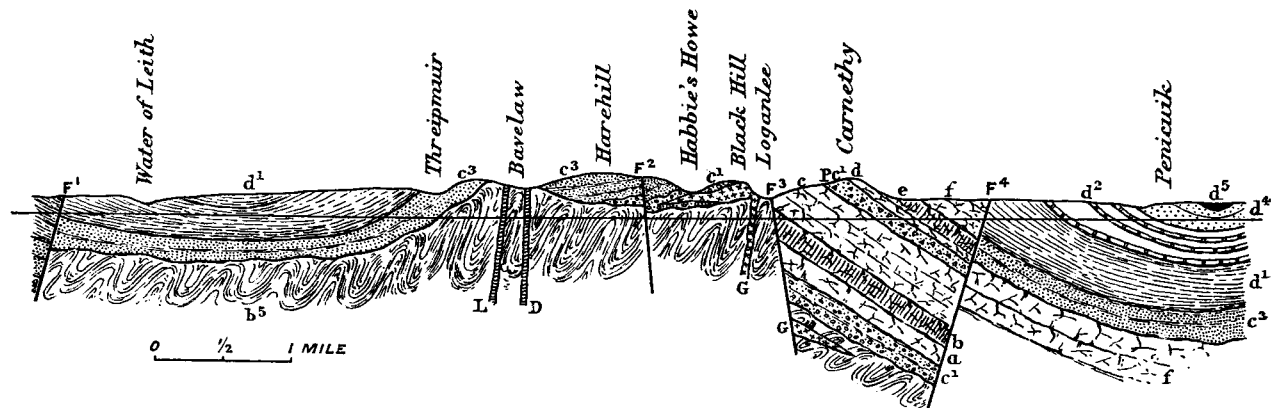


FIG. 2.—DIAGRAMMATIC SECTION ACROSS PENTLAND HILLS FROM BALERNO TO PENICUIK.

d^5 . Coal Measures. d^4 . Millstone Grit. d^2 . Carboniferous Limestone Series. d^1 . Calciferous Sandstone Series. c^3 . Upper Old Red Sandstone. c^1 . Lower Old Red Sandstone. Pc^1 . Rhyolitic Tuffs of Lower Old Red Sandstone Age. a . Basic Lavas of Warklaw Hill. b . Acid Lavas of Howden Burn. c . Basic Lavas overlooking Loganlee. d . Acid Lavas of Scald Law and Carnethy. e . Intermediate Lavas of Woodhouselee. f . Basalts (including "Carnethy Porphyry"). b^5 . Upper Silurian.

L. Lamprophyre Dyke. D. Dolerite Dyke. G. Microgranite. F. Colinton Fault. F^2 . Hare Hill Fault. F^3 . Loganlee Fault. F^4 . Pentland Fault.

oldest series in the Pentland Hills. After passing the unconformable junction of the Upper Old Red on this group we encounter the margin of the Black Hill laccolite of felsite; and traversing a splendid dry valley, which bears the marks of glacial stream erosion, we come to the waterfall at which the conglomerates of the Lower Old Red rest unconformably on the Silurian rocks. Next ascending the slopes of Carnethy Hill we cross the outcrops of andesites, tuffs, and rhyolites belonging to the Lower Old Red, and descending on the east side we find more andesites with basalts, some of which are coarsely porphyritic. In the low ground at the foot of the hill we cross the great Pentland fault and enter the syncline of Carboniferous rocks that makes the Lothian coalfield.

Tea at Penicuik.

Return by train from Glencorse or Penicuik.

Fare to Balerno, 6d.; from Penicuik 1s. 1d.

Dinner 7 p.m.

Wednesday, August 6th.—DALMENY AND FORTH BRIDGE.

DIRECTOR : JOHN S. FLETT, D.Sc., LL.D., F.R.S.

Breakfast 8 a.m.

Train to Barnton or Davidson's Mains from Princes Street Station at 9.2 a.m.; fare 3d.

After crossing the River Almond by ferry we enter Lord Rosebery's policies of Dalmeny Park and examine first the quartz diabase sill of The Snab, intrusive into the Lower Carboniferous sandstones of the Oil-shales group. Then walking along the shore, where the raised beaches are well developed, and passing Dalmeny and Barnbogle Castle, we reach Hound Point, where there are excellent sections showing an intrusive sill of quartz diabase breaking through sandstones. We next follow the path to Whitehouse Point, where a great sill of teschenite, showing many variations, forms a considerable stretch of the shore. Next come the Queensferry Cements, the Pumpherston Shales and the Pumpherston Shell-bed; the Burdiehouse Limestone and Camps Shale (just below the Forth Bridge). Thereafter sections will be visited on the railway showing some of the higher beds of the Oil-shale Group of the Lothians.

Tea probably at Queensferry.

Return from Dalmeny Station; fare 10d.

Dinner 7 p.m.

Thursday, August 7th.—KIRKCALDY, KINGHORN AND BURNTISLAND.

DIRECTOR : W. T. GORDON, M.A., D.Sc.

Breakfast 8 a.m.

Train from Waverley Station to Kirkcaldy at 9.30 a.m.

From the Station we shall proceed to the Bleach Works at the south end of the town, where we first meet with some intrusive sheets of dolerite, then the Hosie Limestones of the lower group of limestones in the Carboniferous Limestone Series, and then the uppermost members of the volcanic succession of the Burntisland

volcano. From this point east to Kinghorn there is a continuous descending section of the lavas and ashes of that volcano alternating with shales and sandstones, and three beds of limestone, including the representative of the Hurlet Limestone in this part of Scotland. At Kinghorn there are sandstones and shales, followed again by lavas and ashes as far as Pettycur. Above the railway at that point is the magnificent section of bedded volcanic rocks known as King Alexander's Cliff. Passing this we see the white trap of Dodhead and reach the volcanic neck of the Binn of Burntisland. Thereafter we shall visit the Burdiehouse Limestone, and after crossing several intrusive sills of dolerite, return to Burntisland.

Tea at Burntisland.

Train from Burntisland 5.25 p.m.; arrive Waverley, 6.30 p.m. Return fare, 2s.

Dinner, 7 p.m.

Friday, August 8th.—SICCAR POINT AND COCKBURNSPATH.

DIRECTOR : C. T. CLOUGH, M.A.

Breakfast 8 a.m.

Leave Edinburgh (Waverley) at 9.15 a.m. for Dunbar. Special return fare 3s. 3d.

Drive from Dunbar to Old Cambus, fare about 2s. 6d.

At Siccar Point we shall see the unconformability of the Old Red Sandstone on the Silurian rocks which awakened the curiosity and enthusiasm of Hutton. Thence coming eastwards along the shore we see the sandstones and cornstones of the overlying formation. At Cove the section passes up into the Cementstone Group of the Lower Carboniferous. After crossing a fault we reach a set of coals which probably correspond to the Scremerston Coals of the North of England. Marine limestones follow at Cove Harbour. Thence we shall probably drive back part of the way and visit the Carboniferous Limestone of the Longcraig group about Thorntonloch, where a very complete section is exposed.

Train from Dunbar 6.38 p.m.; arrive Waverley, 7.50 p.m.

Walking distance 8 miles.

Dinner 8.15 p.m.

Saturday, August 9th.—BILSTON BURN AND HAWTHORNDEN.

DIRECTOR : A. MACCONOCHIE.

Leave Edinburgh, Waverley Station, at 9.38 a.m. Return fare, 9d.

Return from Roslin 6.13 p.m. Fare, Roslin to Loanhead, 3d.

From Roslin we shall walk to the Bilston Burn, where a magnificent section of the Carboniferous rocks on the margin of the Dalkeith Coalfield is exposed in the stream section. The Burn has cut its way through the whole of the Carboniferous Limestone Series including the Edge Coals; it starts on the Calciferous Sandstones and at Polton is flowing over the Millstone Grit. From Polton we shall ascend the very picturesque gorge of the North Esk, showing high cliffs of Millstone Grit (the 'Roslin Rock'). This gorge is post-glacial; and the old course of the river, which is obstructed by boulder-clay, will be pointed out. At Roslin an opportunity will be given to examine the celebrated Chapel and the Castle.

Tea at Roslin.

REFERENCES.

MAPS.

- Geological Survey Map of Scotland, Sheet 15, four miles to one inch (1912).
Price 2/6. (*Shows the whole district to be visited.*)
- *Geological Survey Map of Scotland, Sheet 32, one mile to one inch (1910).
Price 2/6. (*Contains all the excursions except Burntisland and Cockburnspath.*)
- Geological Survey Map of Scotland, Sheet 33, one mile to one inch (1910).
Price 2/6. (*For Dunbar district.*)
- Geological Survey Map of Scotland, Sheet 40 (Burntisland), and Sheet 34 (Cockburnspath). Hand-coloured editions only at 14/9 and 3/6.

MEMOIRS OF THE GEOLOGICAL SURVEY.

1900. "The Geology of Central and Western Fife." *Mem. Geol. Surv.* 5/6.
1910. "The Geology of East Lothian." *Mem. Geol. Surv.* 4/6.
1910. * "The Geology of the Neighbourhood of Edinburgh." *Mem. Geol. Surv.* 7/6.
1911. "Description of Arthur's Seat Volcano." *Mem. Geol. Surv.* 6d.
1912. "The Oil-Shales of the Lothians." *Mem. Geol. Surv.* 2/6.
1913. CADELL, H. M.—"The Story of the Forth."

N.B.—* The Edinburgh Memoir and Sheet 32 map are by far the most important of the above list.

GENERAL EXCURSION ARRANGEMENTS.

Whenever **SPECIAL FARES** are quoted, Members should meet the Excursion Secretary at the booking office *at least fifteen minutes before* departure of train.

The **TIMES OF TRAINS** are taken from the current time-table; Members should check them when the new time-tables are published. *In case of alteration* the train will be that *nearest* to the one given.

Members who **PROPOSE JOINING EXCURSIONS AFTER DEPARTURE FROM THE RAILWAY STATION IN LONDON** must *notify their intention* to the Excursion Secretary beforehand, if they desire to be included in any arrangements for tea or carriages. In all such cases it is important that an addressed post-card should be enclosed for acknowledgment, and this acknowledgment should be brought on the Excursion for production, should occasion arise.

SPECIAL NOTICE—INDIVIDUAL REDUCED FARES.

The Excursion Secretary has the pleasure to announce that arrangements have now been made whereby members will be able to obtain, for the purpose of attending meetings and excursions of the Association, railway tickets to the place of meeting at the rate of single fare and one third on presentation of a voucher (signed by the Excursion Secretary) to the booking clerk at their local station. The tickets will be available from the day before to the day after the meeting, Sunday being considered a *dies non*.

GEORGE W. YOUNG, F.G.S.,

Secretary (Excursions),

June 25th, 1913.

20, Grange Road, Barnes, S.W.