at which the sheet thins out in that direction. The figure on the left has his hand on the bottom of the sheet of trap on that side. Time did not allow of an examination of the lavas at Pettycur Point, but they were well seen in the fine cliff overhanging the road, known as King Alexander's Crag. Passing through Kinghorn, the shore at Abden was visited, and the higher limestone bands of Yoredale age interstratified with lavas and tuffs were seen. Here a search was made for the Bone Bed (see p. 143), but, unfortunately, none of the party was successful in hitting upon it. The return to Edinburgh was made from Kinghorn at 5.51. Later on, the members dined together at the Clarendon Hotel, the Directors being the guests of the evening.

LONG EXCURSION.—COCKBURNSPATH.

FRIDAY, JULY 30TH, 1897.

Director : J. G. GOODCHILD, F.G.S., F.Z.S.

(*Report by* R. S. HERRIES.)

A START was made nominally at 10.20 from the Waverley Station, the express being specially stopped at Cockburnspath, but owing to the trains from the north being very late, considerably more than an hour was lost, which necessitated some curtailment of the programme. Cockburnspath, or Copeth, which is in Berwickshire, is situated at the junction of the Lower Carboniferous with the Upper Old Red Sandstone. The party proceeded along the cliff about three miles to Siccar Point, where on the shore a magnificent unconformable junction is seen. Here the gently dipping beds of the Upper Old Red rest like tables on the edges of the almost vertical Silurian beds, striking at right angles to the coast. These beds belong to the Gala series, and are the equivalent in age of the Tarannon Shales of Wales. This fine junction is represented on Plate VIII B., reproduced from a photograph by Mr. H. C. McNeill. A halt was made here for luncheon, and an excellent group of the party was taken by Mr. James Pringle, of Copeth, who had accompanied the excursion. Proceeding along the coast southwards, the beds of the Upper Old Red were examined, and at least one specimen of a *Holoptychius* scale was picked up. The party then went inland to the Old Cambus Quarry, where the highly inclined and folded beds of the Gala group of the Silurian were again seen. Some time was spent here in searching for graptolites, and most of the

A.—WHITE TRAP INTRUSIVE INTO LOWER CARBONIFEROUS STRATA,
DODHEAD QUARRY, BURNTISLAND.

B.—UNCONFORMABLE JUNCTION OF UPPER OLD RED SANDSTONE AND
SILURIAN (GALA BEDS), SICCAR POINT, BERWICKSHIRE.

(From photographs by H. C. McNeill, A.R.S.M.)

members were well rewarded. On the return to Cockburnspath the Peaseburn was crossed, a very picturesque example of a dene, about the formation of which the Director made some remarks (see page 122). The return to Edinburgh was made by the 6.23 train.

LONG EXCURSION.—ELIE AND ST. MONANS.

SATURDAY, JULY 31ST, 1897.

Director : PROF. JAMES GEIKIE, LL.D., F.R.S. L AND E., F.G.S.

(*Report by* THE DIRECTOR.)

It was at first intended that the party should proceed to St. Monans, and work back along the coast to Elie; but as the most interesting and important sections occur nearest to the last-named place, and the tide was flowing, it was considered advisable to visit the best sections first. The party assembled at Elie Harbour, in the centre of one of the remarkable volcanic necks for which this part of Fife is so noted. Here the Director gave a short outline of the various geological features to be studied. The region to be traversed lay wholly within the Carboniferous area, the strata representing the base of the Limestone series and the upper portion of the Calciferous Sandstone series. At Elie the prevalent dip is towards the west, while at St. Monans the inclination of the strata is easterly. At these two places the basement beds of the Limestone series are exposed, the stretch of coast-line between them showing the upper members of the underlying Calciferous Sandstones disposed in a series of more or less gentle, but sometimes sharp, anticlines and synclines. Between Elie and St. Monans no fewer than nine volcanic necks are exposed, and the main object of the Excursion was the examination of these and their relation to the rocks they traverse.

At Elie Harbour many interesting features were observed. The strata at the line of junction with the neck were much jumbled and shattered, often dipping in towards the neck at a high angle, and even in places standing on end. Here and there, also, the sandstones were baked and hardened so as to resemble quartzite and porcellanite. The neck was filled with agglomerate and tuff—the rock fragments consisting of sandstone, shale, limestone, basalt, diabase, etc. These fragmental materials showed a kind of rude bedding, having a distinctly centroclinal dip. Thin dykes and veins of basalt cut across the neck, and the adjacent sandstones and shales. Similar features characterised most of the necks subsequently visited, but were nowhere better displayed