LONG EXCURSION.—BURNTISLAND AND KINGHORN.

THURSDAY, JULY 29TH, 1897.

Director: J. G. GOODCHILD, F.G.S., F.Z.S.*(Report by R. S. HERRIES.)*

THE party left the Waverley Station at 9.50 for Burntisland, on the coast of Fife, *via* the Forth Bridge. The first section inspected was a cutting on the railway, which had been passed through in the train shortly before reaching the station. The rock here had only recently been recognised as a picrite, and the Director drew attention to the formation of "white trap" at the junction between the intrusive and sedimentary rocks (p. 138). The party then climbed the hill to the Grange Quarry, noticing some fragments of Granton Shales on the way, from which coprolites and other fish remains were obtained. In the quarry the Burdiehouse Limestone, a thin but persistent bed, is exposed. The ascent was continued till the summit of the Binn of Burntisland was reached, where a halt was made for luncheon and for the examination of the very fine sections of volcanic agglomerate (see p. 137). The Director explained that this mass of agglomerate was an old neck, and that from this point in all probability a large proportion of the great mass of lavas and tuffs to the immediate north and east had been emitted. The agglomerate is traversed by several basaltic dykes. While on this elevated spot, from which a very fine view of the Firth of Forth was obtained, the Director took occasion to make some remarks about the depression and elevation of the land since the Tertiary period. The many islands which were seen dotted about, were, he said, the tops of old hills; after partial or complete submergence these had been brought again to light by the elevation of the land, evidence of which was to be seen in the raised beaches, four of which at different levels were to be seen from that spot. Coming down, there was no time to visit the Oil Shale Works, though the Director pointed out the character of the shale, as some heaps of tipped material were passed. The shales were seen to contain abundant fish scales, and a few teeth were obtained. The Dodhead Quarry was next visited, and the classic example of a "White Trap" intrusion was observed with much interest (see p. 139). The trap has forced its way up through the strata to a certain level, and then spreads horizontally between the layers of stratified rock. On one side it dies out quickly, but on the other it continues throughout the exposure, some 200 feet. A photograph of this intrusion, by Mr. H. C. McNeill, is reproduced on Plate VIII A. The figure in the centre is pointing out the root of the intrusion, while that on the right marks the point

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