Monday, 4th June 1883.

MR ROBERT GRAY, Vice-President, in the Chair.

The following Communications were read :—

1. The Diurnal Oscillations of the Barometer. Part II. By Mr A. Buchan.

2. Ninth Report of the Boulder Committee. Communicated by Mr Milne Home.

I.—*NOTES BY CONVENER.*

ARGYLESHIRE.

I. 12*th July* 1882, *Stonefield House, Argyleshire*, residence of C. G. Campbell, Esq.—Was guided by Mr Alexander of Lochgilphead, to the hills of *Glen Ralloch*, situated to the north of the narrow neck of land which connects East and West Loch Tarbert. The rocks of the hills are gneiss, full of quartz veins. When among those hills, I saw many boulders of small size lying on the sides, and some on the very tops. Their composition, resembling clay-slate, differed from the rocks, and they were all more or less angular. They were mostly on slopes facing, or exposed to, westerly points.

On reaching a hill on the north side of West Loch Tarbert, and sloping down due south towards the loch, at an angle of about 40°, and at a height above the sea of 400 feet, fell in with a boulder lying on the surface, $7 \times 5\frac{1}{2} \times 3$ feet. The rock, visible almost directly under, and at all events very close to, the boulder, was a schistose clay-slate, but with a sprinkling of gravel over its outcrop. The boulder could not probably come from the north, as the hill in that direction rises to a height of about 200 feet above the boulder, and is steeper near the top. The directions from which the boulder might most easily have come are S.E., S., or S.W., this last being the line of the arm of the sea called West Loch Tarbert. The hills to the west, and still more to N.W., appeared too high to have allowed the boulder to have come across them.

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II. 14*th July* 1882, *Ormsary House* (on south bank of Loch Killesport), *Argyleshire*, residence of Mrs Campbell.—Set out, under the guidance of Mr Alexander, to visit *Clach Briach* (stone-spotted hill), on which he informed me I would find a number of large boulders.

This hill being situated a few miles to the east of Ormsary House we had to pass the "*Big Boulder*" near the high road, described in a previous Report (Sixth, p. 14), and illustrated there by diagram 5.

I was again struck with the fact, that at this spot there is a great multitude of boulders, several of them touching one another. I counted ten, occupying a space less than 2 acres in extent; one of these (apparently not mentioned in the previous Reports) measured $16 \times 12 \times 8$ feet.

Mr Alexander informed me that on the hills along the south side of Killesport, *west of Ormsary House*, there are no boulders; and that they occur only on the hills to the east of Ormsary House, with the exception of two on the sea-beach. The only peculiarity which I discovered in these respective hills was that to the west of Ormsary the sides of the hills facing Loch Killesport are excessively steep, whereas the hills to the east of Ormsary slope more gently to the Loch, and are not so high. If the boulders were brought on floating ice from the W., or W.N.W., would the last-mentioned hills, because of their more gentle slope, not have more readily arrested the ice, and have afforded sites for boulders when the ice melted?

We passed through a valley called *Baronlungart*, running E. and W. between *Ormsary* and *Achoos*. In the bottom of the valley there are several spots where the rocks are beautifully ground down and smoothed, evidently from the westward. This valley is about 60 feet above the sea-level. A few boulders are lying in the valley.

Having reached the shepherd's house, on *Clach Briach* hill, I mounted a horse and followed a peat road for about a mile in a westerly direction, till we reached a level of about 400 feet above the sea, and came to a place from which we could look down to the north on the farmhouse of *Tign-a-Kaim*. The hill, along the ridge of which we had ascended, terminated at this place in a rounded

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end, sloping down northward, westward, and southward. The slope most thickly covered with boulders was that sloping to N.W. at an angle of about 40° (see diagram 1). The three largest were of the following sizes:—15 × 8 × 5 feet; 18 × 9 × 8 feet; 12 × 7 × 4 feet.

The boulders are all, more or less, well rounded. The sides most rounded were those facing N.W., suggesting the idea that, after having reached the hill, they had been exposed for some time to friction from some agent impinging on, or passing over, them.

They appeared to be all composed of one description of rock, viz., a compact fine-grained gneiss, which is also the composition of the Ormsary "Big Boulder" and its companions, before referred to. The rocks *in situ* on this *Tigh-a-Kaim* hill are soft schist, and on edge.

On the highest part of the hill, and about 20 or 30 yards on the south side (at A on fig. 1), there are several boulders in positions of considerable interest. These are shown on fig. 2. Where boulder A is represented on fig. 2, the ground is nearly flat; at B, the ground begins to slope slightly down south; and at D, the southward slope is as much as 20° or 23°. Boulder D has a girth of about 26 paces, or 78 feet. Its height is about 15 feet. The size of B is 10 × 10 × 10 feet, and of A, 6 × 5 × 3 feet.

It was observed that a fragment had been broken off each of the two largest boulders at their south ends. The form of the fragments and their proximity to the boulders made this evident. There may originally have been cracks in the boulders, allowing rain to enter, and the action of frost to split off the ends. Another conjecture is, that if the boulders, when brought to the hill, fell from any height, and if they had a projecting piece of rock at their south ends, the concussion in the mass, produced by the central solid portion of the boulder first striking the hill, might cause the projecting piece to break off. The direction of the longer axis of the largest boulder D is about W.N.W. and E.S.E.

Not far from these, and also on or close to the highest part of the hill, there are other two boulders (shown on diagram 3) touching one another, A being 17 × 8 × 8 feet, and B 18 × 10 × 10 feet. The direction of the longer axis of A is S.W., and of B, N.W. A small boulder lies between the two, at the north end, firmly jammed. It

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seemed probable, from the positions of the boulders, that boulder B was the first to come, and that the others subsequently had been intercepted by B in their further progress eastward.

From this hill the three Paps of Jura, 2500 feet high, are visible, bearing W.N.W. The more distant island of Mull, reaching to a height of 3000 feet, bears N.N.W. If the boulders on Loch Killesport, above described, came from either of these sources, they must have crossed, not only two sounds or arms of the sea, but also the two or three tongues of land which project from this part of the coast of Argyle. Before, however, that suggestion can be favoured, it would require to be shown that the rocks composing the boulders are similar in composition to rocks in Jura or Mull.

To the west of the *Tign-na-Kain* hills, above described, there is another hill, separated from them, by a small valley, on which many boulders are visible, on the side of the hill sloping to the north. This hill is almost 100 feet higher; but I could not ascend it, much to my regret.

18*th July* 1882, *Taynish House*, on Loch Sweyn, the property of Captain Campbell of Inverneil.—The house, garden, and policy are at the point of a narrow tongue of land, on the south side of *Loch Sweyn*, which projects into the loch in a S.S.W. direction. Near the point where this tongue reaches the sea there is on it a ridge, running (by compass) about W. by S., with a breadth of about 100 yards, and rising eastwards to a height of about 100 feet above the sea.

This tongue of land, especially on its higher parts and on its northern slope, is covered by above 50 boulders, the largest of which are of the following sizes :—

18 × 11 × 8 feet. Its longer axis lies W. by S., and small end to west. It lies on the broken edges of vertical strata, as shown in diagram 4. Its longitudinal axis dips to west, at an angle of about 20°. *r*, *r*, *r* are edges of the rocks *in situ* on which the boulder rests.

15 × 19 × 5 feet. Its longer axis is N.E. and S.W.

8 × 4 × 3 feet. „ W. by S.

8 × 4 × 2½ „ W. by S. with small end to westward.

9 × 6 × 4 feet. Its longer axis W. by S.

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Diagram 5 is a ground plan of the surface on which these boulders lie,—*b* is about 100 feet above the sea, and *d* about 60 feet; *b*, *d* representing a ridge running about W. by S. and E. by N., with the surface sloping gently down on each side towards the north and south respectively, as shown by arrows and the letters *e*, *f*. Much of this rocky tongue on which the boulders lie has been ground down to a smooth surface.

The site of the largest boulder B represented is shown in diagram 5 on the northern slope at B.

The greatest number of boulders deposited is on the northern slope (diagram *e*, *a*, *b*), as if they had come from some north-westward point, and had been intercepted by the slope.

The position of these boulders, especially of the largest, renders it more probable that they came by floating ice from the sea, than by a glacier from the land.

Learnt from the shepherd's wife, an intelligent woman, residing in the offices of Taynish House, that there are two other large boulders at or near the shore, about 300 yards south of Taynish House; but bad weather prevented a visit to them. In the policy of Taynish, close to the avenue, about half a mile to the east of the house, we observed many boulders on a hill side, sloping down to the north, at about 200 feet above Loch Sweyn.

On our return to Ardrishaig I visited again the large boulder at *Loch Mhurrich*, mentioned in the Sixth Report, p. 16. Ascertained that the depth or vertical thickness of the boulder was, at its east end, 12 feet, and at its west end, 5 feet; its narrowest end being therefore towards the west. Its longer axis, which is W.S.W. and E.N.E., slopes down towards the west.

The situation of this boulder, relatively to the adjoining hills, is shown in diagram 6, where B is the boulder and H rocky hills surrounding the valley, with small boulders scattered over them, shown by dots. These hills rise to the height of from 200 to 300 feet above the sea.

When looking from the boulder towards the west, a range of low hills is seen crossing the valley, about half a mile distant, and in that range a depression occurs, through which the road passes, leading westward to Keills. The summit level of this depression is about 100 feet above the sea, whilst the rest of the range crossing

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the valley reaches to a height of from 300 to 350 feet. The bearing of this depression from the boulder is W.S.W., coinciding with the direction of the longer axis of the boulder. If the boulder had been carried to the spot where it now lies, from the westward, it would probably be by ice floating through the depression before referred to. For any land glacier the locality seems quite unsuitable.

On our way back to Ardrishaig we observed, on the hills within sight of the road, many boulders. They lie most frequently on slopes facing some westerly point. Thus, on a hill called "*Leck-na-Ban*," on the north side of the road, at about 300 feet above the sea, where the slope is towards W.S.W. at an angle of about 10°, a boulder 10 × 8 × 6 feet is lying on the edge of vertical strata, the boulder being a light-coloured fine-grained crystalline gneiss, while the rocks on which it lies are a soft slaty schist.

Near the Crinan Canal at *Ballanoch*, on the hill above the high road, and about half a mile from the canal, there is a boulder 16 × 9 × 9 feet, at a height of about 300 feet above the sea. It lies on the north side of the valley through which the road passes. The general direction of the valley is N.E. by N. and S.W. by S. The longest axis of the boulder coincides with the direction of the valley. The boulder is lying on bared rocks. It seemed probable that ice carrying boulders had floated through this valley, and lodged the boulder.

19*th July* 1882, *Ardrishaig Hotel*.—In the Seventh Boulder Report, p. 10, a very partial account was given of smoothed and striated rocks at *Kilmory*, at the western extremity of the tongue of land dividing *Loch Killesport* from *Loch Sweyn*. I therefore returned there, to examine the spot more minutely, in company with Mr Alexander of Lochgilphead.

At *Ardna*, Mr Macmillan's farm, I saw again the large expanse of these interesting rocks.

The extent of rock surface, horizontally, is about 13 yards, and vertically, about 5 yards. The surface in different parts slopes down towards S. by E.—S.—S.S.E.—and S.E., at angles varying from 30° to 40°. They have been most severely rutted, on the slopes which face S. and S. by E. Where the surface slopes down S.E. it is not striated, only smoothed; showing that the striating agent did not

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move in such a direction, as to touch or strike, or at all events press severely on the S.E. slope. In some places the striæ were seen to have been more deeply cut at their *west* ends than at their east ends. Some of the striæ at their west ends are as much as 3 inches wide. The direction of the striating agent must therefore have probably been from W. by S., or due west, to have made the striæ. Portions of the smoothed rock surfaces were broken into small shallow depressions, and in these pebbles of hard rocks were observed, somewhat firmly packed, and where probably they have been lying since the time they were originally deposited. It was by such tools as these that the striæ had no doubt been formed on the smoothed surfaces of the rocks. A representation of a few of these striæ, and of the depressions in the rocky surface, is given in diagram 7.

That there must have been heavy pressure on these smoothed rocks, is evident from this fact, that though the rocks are dipping or sloping down towards the south, at an angle of as much as 40°, the striæ are all *horizontal*, or nearly so,—showing that the striating body was of such bulk and weight as to keep steadily on in its course, in spite of the tendency, by gravitation, to slide down the face of the rock.

On the hill where these smoothed and striated rocks occur, boulders of small size (comparatively), and much drift of hard rounded pebbles, are plentiful.

After examining these rocks I climbed the hill to the eastward to a height of about 600 feet, and passed several striated rocks, and three boulders of the following sizes:—$11 \times 7 \times 3$ feet, $12 \times 5 \times 2\frac{1}{2}$ feet, $15 \times 6 \times 4$ feet. Each boulder has its longer axis pointing in the same direction, viz., W.S.W. and E.N.E. These are situated near the top, and on the side of the hill sloping down towards the S.S.E.

Having crossed the ridge of the hill towards the north, and descended a little way on the side sloping down towards N.N.W., I was struck at finding almost all the boulders lying with their longer axis W.N.W. and E.S.E. The following are the sizes of the largest boulders examined:—$11 \times 6 \times 3$ feet (with sharp end to N.W.), $14 \times 8 \times 3$ feet, $14 \times 7 \times 7$ feet (its longer axis was W.S.W.), $21 \times 7 \times 3$ feet, $9 \times 6 \times 4$ feet (its longer axis due west); but here there was a change in the down slope of the hill, viz.,

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towards W. by N., instead of N.N.W. This last mentioned boulder was lying not on drift, as the others were, but on bare rock.

A little further east, where the high road passes through the lands of Castle Sweyn, but above the road, and at a level of about 200 feet above the sea, found a group or cluster of boulders, four or five in number, touching and partly covering one another, as shown in diagram 8. The remarkable feature of the spot is, that the slope of the hill here is so steep—about 40°—that it was hardly conceivable how the blocks should, when laid down on such a slope, have remained on it, and have for ages retained their position. The only probable explanation seemed to be, that beneath the two lowest boulders there were portions of projecting rock which supported the whole group. The slope of the hill here is down towards W.N.W. A study of the whole position led to the conclusion that these boulders, to obtain their lodgment, must have been brought from W. by N.

Still farther east the road passes over an extensive plateau or table-land of drift, which has a general height of 120 feet above the sea. The farm of *Doidhe* is here. A gravel pit (almost 8 feet deep) for the excavation of road metal was examined. The layers of gravel and sand in it were found to be horizontal.

All along the road towards *Ashfield*, *Deltot*, and *Achnamara*, large boulders occur on both sides, though not in nearly such numbers, as near the open sea at *Kilmory*, and near *Castle Sweyn*.

20*th July*, *Ardrishaig*.—Was guided by Mr Alexander to the farm of *Ach-na-Brack* (*Field of Spots*) to see some remarkable sculptured cup-markings on smoothed rocks.

These rocks occupy an extensive portion of pasture ground. They are of hard gneiss, and the smoothed surfaces slope down towards about S.W. at an angle of 10° or 12°. They have evidently been smoothed by natural agency. Striæ occur on them at several places. The direction of the striæ varies a little, being in some spots from W. by N., in others from N.W. One small boulder was seen, on the west side of one of the smoothed ridges of rock, and seemed to have been stopped by the rock in its progress eastward.

The cup-markings are very numerous, and consist as usual of circular ruts as shown in fig. 9. They are of different sizes; the largest about 2 feet across. The straight rut issuing from the

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centre, and cutting across the circular ruts, had in almost all cases been formed in unison with the downward slope of the rock. There are 20 or 30 of those cup-markings, and they well deserve to be described and sketched. Archæologists have never yet been able to suggest any plausible explanation of the object or meaning of these ancient symbols.

Berwickshire.

August 1882.—Convener received from his factor, Mr Muirhead, a chip of a small dark-coloured syenite boulder, found on Lamberton Hill, four miles north of Berwick, at a height of about 600 feet above the sea. It was found near the summit of the hill, which there forms a ridge running N. and S. It was on the slope of the hill facing the west. The only locality in Berwickshire for syenite rock is Stenchel Hill, on east side of Cockburn Law, distant about 10 miles to W.N.W. The size of the boulder was 30 × 16 × 16 inches, weighing about 20 stones. The whole of Lamberton Hill is a mass of porphyry.

II.—*NOTES BY PROFESSOR HEDDLE.*

1. *Excursion from Killin (Perthshire) up the N. and S. valley of Radour, in Kenmore Parish,—over Heasgarnich, 3530 feet, to Loch Lyon,—and thence down the Allt Chonoghlais valley to Tyndrum, accompanied by Rev. Mr Peyton, of Free St Luke's, Broughty Ferry.*

1. In Radour valley is found on the slopes of *Creag nam Bodach*, at altitude of 1400 feet above the sea, a boulder 9 × 7 × 7 feet, of "pure *white quartz*," sharp and angular. The rock of all the hills hereabouts is "*flaggy gneiss.*"

There is such quartz rock on *Creag Mhor* and *Ben Dorean*, situated to the W. and N.W.; also, a quartz rock, though not quite similar, on *Meall Ghaordie* to the east.

2. On the *Heasgarnich* side of the same valley, there is a boulder 13 × 5 × 6½ feet, somewhat more gneissose than the flaggy rock of the district, at an altitude of 1600 feet.

3. Towards the rounded head of the glen, at an altitude of about

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1650 feet, there are eight other boulders, averaging 11 × 5 × 4 feet, and forming a line across the valley.

4. The pass at the head of *Loch Lyon* is crowded with *till*, which fills great stretches of the valley. It has been by some means shaped or worn into conical mounds, and abounds from the level of the lake, at 1100 feet above the sea, down to about 800 feet.

2. *Excursion from Killin to Bowachter, in Glen Dochart (Perthshire), and thence over Sgiath Chrom, 2780 feet; Sgiath Chuil, 3050 feet; Meall Chuirn, 3057 feet; and along the ridge over Meall na Saone, 2835 feet, eastward to Mid Hill, 1977 feet; accompanied by Professor Butler and Mr Colin Phillip.*

1. On the south side of *Sgiath Chrom*, at altitude of 1520 feet, found two boulders; one in size about a cubic yard, the other 8 × 5 × 4 feet. This last was of hornblendic gneiss with chlorite, similar to a rock seen by me on a previous occasion, between *Ben Laoigh* and *Ben Oss*, situated about 10 miles to W.S.W.

2. On the east side of *Meall Chuirn*, found a valley or trench running N. and E., about 750 feet deep, separating that hill from the ridge to the east. On the east slope of this trench, found some loose rock, apparently not fallen from the upper part or side of the valley, but ice-carried.

3. Proceeding towards the eastward, found three small hills with flattened summits, each over the 2750 contour line, but not named on the Ordnance map. The most northern of these is very precipitous on its sides, and separated from the other two by narrow cols about 80 feet deep. From the top of one of these, which we ascended, we descried a boulder perched on the top of another hill with precipitous sides, lying in a slight depression. The boulder was apparently about 10 feet cube. Considering this boulder, on account of its position, to be one of interest, we retraced our steps about 300 yards, to try and reach the boulder, but were defeated. There was over a foot of newly-fallen snow, which prevented our finding a firm footing, and caused constant and dangerous slipping.

4. Proceeding about three miles farther eastward, towards the *Mid Hill*, 1977 feet, we had to cross a depressed flat surface, now a peat bog, about 200 feet below the top of the hill. The summit

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of the hill consists of flattened rock, whose contour "shows unmistakably that its form is the result of a body of ice having passed over it from the west." Its eastern end shows marks of having been broken; and some little space eastward from the cliff there is a great rugged block, which seems to have been detached from the rocky cliff, and pushed a little way eastward.

3. *Excursion from Luib Railway Station northward, over Beinn nan Clach,* 2309 *feet; Bein nan Imirean,* 2500 *feet; Bein Glas,* 3139 *feet; Bein Dheiceach,* 3074 *feet; then down stream-valley, back to Luib;—with Mr Colin Phillip.*

1. Found the whole south side of *Beinn nan Clach* from 2000 to 2100 feet, sprinkled with boulders from 1 to 3 cubic yards in bulk. They consisted of a kind of rock differing from that of the hill, being more chloritic.

Found a line of somewhat larger boulders lying along the top ridge of the hill, stretching in a line towards *Imirean.* Found a much rounded block about two cubic yards in bulk upon the *solid rock of the very summit of the hill,* at a height of 2309 feet above the sea (see fig. 10). The rock of the summit was also much rounded.

Noticed also the outcrop of some nearly horizontal strata, with scattered dislodged fragments; suggesting the action of some moving body which had been grinding on and rupturing the edges of the strata.

Found blocks at about the same, or rather lower level, in the corry between *Beinn nan Clach* and *Beinn Glass,* as also at the foot of the east slope of *Bein Dheiceach;* but these might have fallen from rocky cliffs above them.

During the two last excursions, looking across Glen Dochart southwards, some very large boulders were descried on the N.E. shoulder of Ben More (3843 feet). They were on a little flat, at about from 1750 to 2000 feet up. These could not be "fallen blocks." The ridge on which they rest was too narrow, and the slope too great, for falling masses to have been arrested where they lie. Ice seemed the more probable agency.

On a review of the facts observed during the foregoing excursions, I cannot explain them by the agency of local glaciers; nor can I conceive how a great solid mantle of ice covering the whole country,

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and sliding over the hills, could have left the number of blocks we saw on their summits.

4. *Excursion over the hills situated to the east of Loch Laggan, in Lochaber, Inverness-shire.* (IV. *and* V. *were with Rev. Mr Peyton.*)

Started from Loch Laggan Inn, and went N.E. by *Meall Ghrealach* (1650 feet), *Buidh' Aonach* (3037 feet), along the ridge to *Creag Meaghaidh* (3700 feet), thence descending upon Moy.

On the south slope of *Buidh Aonach*, two grey granite boulders were found on a small plat at 2260 feet contour line.

About the centre of the long ridge, and nearly due N. of the centre of Loch Laggan, there is a round and broad eminence 3238 feet high. This eminence is bedded with gravelly clay, resulting apparently from the disintegration of granite belts in the gneiss. We counted on this eminence about twenty-four large and much-rounded grey granite boulders, identical in character with those seen on the south slope of the hill above mentioned. Some of them were lying on the surface of the clay, some were half bedded. Veins of granite were found in the flaggy gneiss of the hill. In these veins there were masses in every stage of being rounded by decay and by weathering, becoming loosened out of the gneiss rock, with portions of the rock adherent. None were so large as the blocks lying in the adjoining district.

It occurred to me that many grey granite blocks considered to be boulders may have originated in this way, and may have been pushed from their birthplace,—as, for example, the blocks seen on the south slope of the hill above referred to.

In last year's Report reference was made to grey granite boulders seen on or near the top of *Craig Dhu* (2161), at the mouth of Glen Roy, about 15 miles west of Buidh Aonach. Might these not have originated in the same way? No veins, however, were seen on Craig Dhu.

5. *District near Loch Clunie, north of Caledonian Canal.*

1. In driving up *Glen Morriston*, we observed at the east end of the summit of a hill about 1000 feet above the sea, near the junction

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of the River Loyne with the stream flowing from Loch Clunie, "a *grand* boulder;" but it was some distance from the road along which we were driving, and we could not reach it.

From Clunie Inn we ascended *Carn Ghluasaid* (3140 feet); *Carn Glas* (3260 feet); *Sgùrr nan Conbhairean* ("*Ben-doe*") (3634 feet); *Carn Dubh Liath* (3280 feet); and *Garbh leac* (3673 feet), and then back to Clunie Inn.

On the south slope of the first-named hill, at a height of 1475 feet, we found two grey granite boulders, each about 3 cubic yards in bulk, stopped against a little knoll to the S.E.

3. On another day we climbed *Stob Bathaich* (2740 feet) (opposite *Am Bathaich*), the S.E. spur of *Carn Fuaralach* (3241), and found on it two blocks. At the height of 850 feet, and at a distance of about 400 yards north of Clunie Inn, several fragments of rock were found, which we ultimately considered to be fallen rocks.

At a height of about 1520 feet, on the east slope of the same hill, we found several large blocks, which had been clearly transported. They are angular, and their resting on so steep a slope was most striking. The largest is represented on fig. 11.

On the same hill, at a height of about 2000 feet, and on its S.S.W. slope, we found an angular block $13 \times 5 \times 4$ feet. Observing not far off an outcrop of rock of the same description (white quartzy gneiss), about 7 feet high, and bearing W.N.W., about 65 paces distant, and at a somewhat higher level, we saw such appearances on it as to convince us that the block had somehow been torn off from this rock, and lodged where it now lies, viz., about 15 feet below the level of the rock. Between the block and the outcropping rock there is a gully, or hollow, about 15 feet deep, now occupied by a small stream, across which the block must have been carried,—by what agency is the question (see diagram 11).

3. We next proceeded over the hill tops the whole way north to Achnasheen, and were much interested in the number of cases of boulders lying on very steep slopes of high hills. One of the hills ascended was *Sgurr na Lapaich* (3778 feet). From the spongy nature of the grass it was the hardest climb I ever experienced. For about 1500 feet above *Loch Mullardoch*, the slope was at an angle of 47°. At the height of about 1530 feet (above the sea) there rests on the slope a boulder $12 \times 8\frac{1}{2} \times 7\frac{1}{2}$ feet, of hard quartzy

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gneiss. "Did that stone roll down that slope and stick there?" I asked the shepherd who walked with us. The instantaneousness and energy of his "Never!" was delightful. "And why not?" I asked. "Well, in the *first* place, not a peeble can stop on sic a slope, let alane sic a stane as yon, if she ance fetched wey; in the *second* place, there are nae stanes ava on the tap, but jist a peat bog; and in the *third*, there's no a stane just exactly of this natur' in the hill." We found, on surmounting the first heave of the hill, 2250 feet, a wide expanse of bog.

6. *Aberfoil.*

Ascended two small hills. The first (*Arndrum*) is a portion of the ridge of *conglomerate rock* which, in the east, occurs at Callander, and in the west crosses Loch Lomond, forming a line of islands. The ridge thus stretches E.N.E. and W.S.W.

On this hill I found, at the height of 230 feet, a line of six boulders of angular fragmentary gneiss (greywacke), stretching from N. to S. They were closely adjacent, viz., from 2 to 20 feet apart, and from $\frac{3}{4}$ to 3 cubic yards in size.

To the west of this line, four other similar boulders lay along the summit of the ridge, and thus at right angles to the first line. They stretched nearly to the top of the hill, viz., to 454 feet.

III.—*NOTES BY MR MURRAY, GLASGOW.*

Islands of Colonsay and Oronsay.

Mr Murray of No. 169 West George Street, Glasgow, having during the last two summers spent some weeks in the island of Oronsay, was so obliging, at the request of the Convener, as to search for boulders on these islands, and has sent to the Convener notes, from which the following are extracts :—

1. *Oronsay.*

Along the sea-beaches the shingle is found to contain pebbles and blocks of syenite, grey granite, and greenstone.

The syenite may probably have been derived from rocks at Killoran Bay, in Colonsay, about 9 miles distant to the N.N.W.; and

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the grey granite and greenstone from rocks at and near Schallasaig, about 5 miles distant, on the east side of Colonsay, to the N.N.E.

There are also fragments of a bright red granite, with large crystals; but no rocks of a similar composition were met with on either island. These were found at "Port na Long," on the west shore of Oronsay, and also at Poll Gorm, on the eastern extremity of Oronsay.

A little to the south of the large sandy bay on the east side of Oronsay (Traigh na Shella), there is a boulder of coarse-grained granite, "of a *pinky* colour," probably the same kind of rock as that found at and near Schallasaig. Its size is $3 \times 2 \times 2$ feet.*

Near this boulder there is one of quartzite, $2 \times 2 \times 2$ feet, differing in composition from any rocks seen. Beside it there are nodules of chocolate red sandstone; also not seen on the island *in situ*.

A little to the south in a narrow gully, there is another coarse quartzite $4 \times 3 \times 3$ feet, partly bedded in the sand.

Highest hills in Oronsay (304 feet) are rounded, and the rocks near the base are generally smooth, like those now washed by the sea. No boulders were seen on them.

The strand, a low sandy tract, dividing Oronsay from Colonsay (covered by the sea at high water), has several boulders of small size on it, and in particular one of red sandstone and one of a reddish-grey granite.

On the west side of the strand, on the farm of *Garbh*, there are several small boulders of grey granite.

2. *Colonsay.*

At Schallasaig (a harbour on the east coast) there is a considerable extent of grey granite rocks *in situ*—and across the island, towards the west, there is a depression or hollow, which reaches to the coast. Strewed over this hollow there are blocks of Schallasaig granite. About half-way across there is a hill about 20 feet high, called "*Cnoc an Ard Righ.*" The Schallasaig granite rocks apparently come no farther west than this hill.

* *Note by Convener.*—Professor Geikie, in a recent paper published in the *Transactions of the Glasgow Geological Society* (vol. vi. p. 160) on the "Geology of Colonsay," mentions, that in the neighbourhood of Schallasaig there is a "granitoid rock" containing *felspar*, "which sometimes shows a rosy flush."

Near Meall Buic, situated about 2 miles S.W. of Schallasaig, a great pit has been opened for gravel and sand. In this pit, a number of boulders occur, the largest about 4 feet long. Two of these have striæ or ruts on their surface, parallel with longer axis. Though many are apparently of Schallasaig granite, there are others, which were not recognised as the same as any rocks on the island.

Some basaltic or whinstone dykes occur on the east coast, a little south of Schallasaig; and boulders of these occur to the west.

At the foot of Dungallon hill (on S.W. coast) there is a sand pit, with a considerable number of boulders, from 1 to 2 feet long, apparently water-rolled. The height above the sea is from 40 to 50 feet.

On the south side of Dungallon, there is Port Loth, where several boulders (about $2 \times 2 \times 1$ feet) of grey granite occur. In a gully in the rocks on N.E. side there is a grey granite boulder, $4 \times 2\frac{1}{2} \times 2\frac{1}{2}$, and one of trap, $4 \times 3 \times 2\frac{1}{2}$ feet, well smoothed. To the north there are more, all apparently the same as Schallasaig; but besides them, there are some granites of a yellowish-red colour, different from any *rocks* seen.

In the N.W. part of Skipness the hills are rounded and smoothed, but no boulders were seen on them.*

3. *Shingle Beaches.*

Along the shores of both islands, and even on inland spots, especially in Colonsay, there are extensive collections of pebbles and small boulders, all evidently water worn,—some of them reaching to a height of 70 feet above the present shore. The pebbles and boulders

* *Note by Convener.*—With reference to the granite boulders, which in most cases Mr Murray seems inclined to connect with the Schallasaig granite rocks, it should be kept in view that at Killoran (in the N.W. of Colonsay) there are, as Mr Murray states, "rocks of both red granite and grey granite, which rise in masses to the height of 200 feet. The grey is found as far east as Ballinahard. At the same place there is an exposure of a third granite, of a dark colour, resembling syenite. In the same neighbourhood the schist is much contorted and burnt; and at its junction with the granite there is a vein of quartz rock or quartzite."

Professor Geikie, in his memoir on the "Geology of Colonsay," already quoted confirms Mr Murray's statement, when he refers to "a crystalline rock which appears to be of igneous origin, a syenite consisting of pink felspar and dark green hornblende. It occurs near Skipness, in the north of Colonsay, in which district, the schistose and gneissose strata are much broken and confused."

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consist chiefly of hard crystalline rocks—granite of the grey variety is the most common, but there is also red granite and syenite. One specimen of *flint* was found, much rounded and smooth, as if water worn. The specimen having been sent to the Convener, he forwarded it to Professor Heddle for his opinion. He returned it, stating that it is a "chalcedonic silica," not in the least resembling what occurs in "the Liassic beds of our west coasts," and he suggests that it had probably somehow been transported from Ireland.

The Convener asked whether this flint specimen may not have been brought by a boat or ship? Mr Murray replied that this was impossible, on account of the position where it was found.

Mr Murray gives a list of the various kinds of pebbles and blocks found by him in the raised shingle beach on this part of the coast, and he has sent chips of these with his notes.

In this list the following are mentioned :—

"Red granite, with large flakes of red felspar.

"Claystone porphyry, with imbedded crystals of a chocolate colour.

"White micaceous indurated sandstone.

"Crystalline slate.

"Indurated sandstone; irony stained.

"Chocolate-coloured claystone.

"Syenite.

"Quartzite.

"Claystone porphyry amygdaloidal; chocolate coloured; large imbedded crystals." *

A little way to the north of Dungallon, the raised shingle beach s extensive. There are three terraces rising from the sea-level, each about 7 feet in height. The uppermost and the one next to it, each forms a horizontal flat, about 10 feet wide. The level of the highest part of the beach is about 80 feet above high-water mark.

The shingle extends as far north as the village of Kilchattan. Traces of an old beach at the height of about 60 or 90 feet above sea-level are visible there.

* *Note by Convener.*—Can this be a pebble derived from the rocks in Killoran Bay, described by Professor Geikie as "a remarkable volcanic agglomerate—made up of the broken angular débris of the strata by which it is surrounded?" (Page 160.)

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IV.—*NOTES BY DR TRAILL (ORKNEY).*

Ronaldshay Island (Orkney).

North Ronaldshay.—In the Committee's Report for 1882 Dr Traill stated that the rocks *in situ* consist almost exclusively of Old Red Sandstone flags. On the surface of the island there are several boulders of foreign origin, viz., one of "*coarse conglomerate*," a rock occurring at Heclabir, in the adjacent island of Sanday, situated to the S.W.; smaller blocks of *granite* and *syenite*, transported possibly from Stromness, Pomona Island, distant from Ronaldshay about 45 miles to S.W., between which and Ronaldshay there are several islands and deep-sea sounds; also a stone resembling coarse *jasper*. Some of these blocks have their surfaces flattened and smooth, and in some instances shining, as if they had been ground down and polished.

In a subsequent communication to the Convener, dated 24th Nov. 1882 Dr Traill states, that having recently had to cut a number of trenches or drains through his property near the centre of the island, he had found boulder-clay containing specimens of *flint*, *chalk*, *oolite*, *limestone*, and *sandstone*, and other stones foreign to the island. A portion of one of these stones having been submitted for examination to Dr Heddle, of St Andrews University, he considered it to be a portion of augitic rock, much the same as what he had seen in the island of St Kilda, but nowhere else.

In the North Ronaldshay boulder clay, fragments of marine shells occur, especially *Cyprina Islandica*, and traces also of the more fragile *Astarte* and *Dentalium*.

Professor Heddle writes (16th Dec. 1882) to the Convener regarding these specimens as follows:—"I send to you one of the pieces of flint which Dr Traill got out of the 'till' of N. Ronaldshay, to show how similar it is to the piece of flint you sent to me from Colonsay, which I have no doubt came out of Irish limestone. I never saw chalcedonic silica (as this is) in the least resembling it, in any of the Liassic beds of our West Coast.

"Dr Traill has also shown to me among his spoils from the North Ronaldshay 'till,' two unquestionable pieces of Torridon conglomerate. There is no manner of doubt as to these. He saw many

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large pieces of it. These *must* have come from some site between the Kyle of Durness and Loch Carron.

"Again, another piece of rock is not to be distinguished from a mass of granular labradorite, which I found near the summit of one of the hills in Rum Island.

"I have taken some trouble with these specimens, qualitatively analysing about four of them. Though somewhat differing in appearance, they are all coming out a finely crystalline, dense, pale yellow *dolomite*, approaching to marble, and so may have come from Assynt or the north of Ireland.

"It is most marked, the great number of pieces of this one kind of rock. I regard it as a '*find*' of importance; for surely now that it has been analysed, the rock can be found somewhere *in situ*."

In a memoir on the Orkneys by Messrs Horne and Peach (*Quarterly Journal of London Geological Society* for Nov. 1880), it is mentioned, that in the island of *Stronsa* (not far from Ronaldshay) boulder clay on the eastern shore forms "a continuous cliff for nearly half a mile." "The deposit, which varies from 20 to 30 feet in depth, consists of a tough gritty clay, of a reddish colour, full of well-smoothed and striated stones." "The greater number of included blocks have been derived from the flagstones and sandstone rocks of the neighbourhoods; but the following rocks are likewise represented:—*Granite*, *pink porphyritic felstone*, *gneiss*, *schist*, *quartzite*, *white quartz*, *dark limestone*, *oolitic breccia*, *chalk*, and *chalk flints*,—all of which are foreign to the island." (Page 657.)

"Equally important is the presence of numerous *fragments of marine shells* throughout the deposit." "Nearly all the fragments are smoothed and striated, like the stones in boulder clay; there can be little doubt that these characteristics are due to the very same cause in both cases." (Page 657.)

"In the island of *Shapinshay* shelly boulder clay occurs at various localities, and contains finely striated chalk-stones." (Page 657.)

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V.—*BOULDERS ON EIGG, AS DESCRIBED IN LETTERS TO THE CONVENER, FROM NORMAN MACPHERSON, ESQ., PROPRIETOR OF THE ISLAND.*

1. *Rocks seen on the Surface.*

1. The S.W. part of the island has on it the remarkable ridge of Pitchstone Porphyry, described by Professor Geikie and others, called *Scoor-Eigg*. The length of the ridge is altogether about two miles. It reaches at its east extremity to a height of about 1300 feet above the sea, at its west extremity to a height of from 900 to 990 feet.

It rises from a plateau, which is about 400 feet above the sea.

Its eastern half runs about E. and W., its western half N.N.W. and N.W.

Both north and south sides are precipitous, almost vertical, showing on the north a cliff 270 feet, and on the south a cliff 400 feet in height.

2. The north part of the island, it is believed, consists of bedded basaltic rock, but, being well covered by grass and moss, the rocks are nowhere visible. The island at its N.E. end rises to a height of about 1080 feet above the sea. At its northernmost extremity it is 990 feet above the sea.

The top of the hill is a smooth plateau, about half a mile broad, from which there is a precipitous dip towards the sea, on the N. and E. It is also precipitous towards a flat basin or hollow on the west, about 180 feet above the sea.

In this basin sandstone and limestone rocks, of the oolitic age make their appearance.

2. *Old (apparently) Sea-Beaches.*

These occur at two spots, one in the S.E. corner of the island, at a height of about 60 feet above the sea,—the other on the N.W. end of the island, about 100 feet above the sea. They consist of pebbles of rolled gravel, mostly half inch to three inches in length closely compacted.

Except where these beaches occur, there are no gravel beds known on the island.*

* *Note by the Convener.*—In the 6-inch Ordnance Survey map of Rum, two "gravel pits" are indicated as existing in the N.E. part of the island at a height of about 200 feet above the sea.

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The soil everywhere consists, apparently, of the débris of volcanic rocks.

But wherever the surface is cut through, as by water courses, small stones of a kind of *granite*, from 6 to 18 inches long, are found.

Most of the walls on the island contain stones of this description gathered off the surface of the land.

Near the Manse there is a wall and also a dam for water, at about 221 feet above the sea, in which there are granite blocks from one to three feet in length.

3. *Boulders.*

1. The largest measured for size rests on the *Scoor* ridge, being 4½ feet long, 4 feet 3 inches broad, and the thickest part 4 feet. It is angular, and may be gneiss. It has a considerable vein of quartz in it.

It is near the western extremity of the ridge, and on a part of the ridge which is lower than any other part, viz., 890 feet above the sea.

It is close to the top of the ridge, on the slope facing the north, and so precariously posed, that the least agitation or concussion by ice, or even water, might be expected to topple it down hundreds of feet.

2. There are other boulders of the same species of granite or gneiss, at heights of from 200 to 700 feet above the sea, on ground sloping from the *Scoor* ridge towards the N.E., and also from the opposite hill down towards a water channel.

In a wall there are numbers of granite blocks of such a size as a strong man can lift.

3. In the N.E. part of the island there is a granite boulder, dark in colour, of a larger size than any other. It is on the part of the hill sloping down towards the S.W., about 600 or 700 feet below the top of the hill, and about 300 feet above the sea. A rock very like that composing this boulder (Mr Macpherson states) he has seen on the shores of Loch Alsh, situated to the east of Skye, about 50 miles north of Eigg.

The boulders (Mr Macpherson states) "are of every variety of gneiss and granite, some very dark, some very white, some red, some with little or no mica, some with a great deal."

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Mr Macpherson adds that there are no gneiss or granite rocks in the island; that he has seen rocks of that description in islands and on the mainland, to the N.W., N., and N.E., but that being not sufficiently acquainted with the qualities of these rocks, he cannot venture to indicate the sources of the Eigg boulders.*

* *Note by the Convener.*—The foregoing report on Eigg having been submitted to Professor Heddle, he wrote to the Convener that he had never visited Eigg, but that he was well acquainted with the rocks in Rum, Mull, and Skye. He states that there is no *true* granite in Rum; but that at the S.W. corner of the island there is a large mass of a "variety of syenite, something like grey granite"; and that this syenite, and also the augite rock of the island, are of the "same type as that of the Coolins in Skye, and of St Kilda." He adds that this augite rock is so peculiar, that if the Eigg boulders came from any of the above-mentioned rocks in these islands, he might perhaps be able to recognise them, on getting chips from the boulders.

In consequence of this last remark by Professor Heddle, the Convener applied to Mr Macpherson, to endeavour to obtain chips of the larger boulders in Eigg. In the course of a few weeks about a dozen chips were obtained, and were sent to the Convener.

The Convener thereupon forwarded them to Professor Heddle, who, after a first cursory examination, wrote to the Convener as follows:—"None of the boulders (judging by the chips) are from any point I know. None are granitic. One is a micaceous syenite, with characteristic radiation structure in its felspar. There is a micaceous gneiss—I think a Tiree rock. The others are either highly metamorphosed grits, simulating granites, or gneissose rocks. All are so characteristic that their source is certain to be sooner or later discovered. The island should be visited, to note carefully the features of the '*lie*' of each boulder."

A few days afterwards Professor Heddle wrote to the Convener, that having again examined the chips he found that "they consist of highly metamorphosed grits of gneiss, and of syenite;—they are all of much greater age than any rocks described as occurring in Eigg"; and suggested that they might be submitted to Mr Archibald Geikie and also to Professor Judd, both of whom he knew were well acquainted with West Highland rocks.

The Convener accordingly transmitted the chips to Professor Judd, with a request that if Mr Geikie was in London, he would have the goodness to show them to him.

The Convener has received a note from Professor Judd stating that Mr Geikie and he had looked at the specimens, and he fixes on one which he says "I take for Torridon Sandstone. It is an Arkose, which Mr Geikie thinks may have come from the Torridon group;—but that it reminds him most of some parts of the Old Red Sandstone. None of the boulders are at all like any of the volcanic masses of the Inner Hebrides."

"All the boulders, we both agree, may have come from the great gneiss masses of the central Highlands, and they do not appear to belong to the old Lewisian or Laurentian series. Mr Geikie adds, 'I do not think anybody could venture to fix their source more precisely'; and in this I quite agree with him

Mr Geikie, in his account of the Geology of Eigg, adverts to the channe

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VI.—*NOTES ON FLINT NODULES FOUND ON RAISED SEA-BEACHES AND DRIFT GRAVEL IN WIGTOWNSHIRE. BY REV. GEORGE WILSON, COR. MEM. S.A. SCOT.*

Mr Milne Home asks me (January 1883) for an extract on this subject from an article by me (in vol. i. of the *Collections of the Ayrshire and Wigtownshire Archæological Association*), on the Ancient Stone Implements of Wigtownshire, and to give some additional notes. The passage occurs at page 4.

"The Glenluce implements of flint and other kinds of stone, and of bronze, were first described in 1876, in my notes of some of the articles then presented by me to the Museum of Antiquities in Edinburgh (*Proc. Soc. Antiq. Scot.*, vol. xi. pp. 580–587). The Glenluce flints, &c., are chiefly found on or near certain old sea-beaches at the north shore of the Bay of Luce. These are about 20 feet above the sea-level, and run from north-east to south-west, in parallel storm-beaches, from a point near Park Hay, in Glenluce, to a point near Sandhead, in Stoneykirk, a distance of about six miles. These beaches are in most places covered by sand hills, called the Torrs. They contain many *water-worn nodules of flint*. How did these flints get there? In the paper referred to, I hazarded the opinion that they are 'the relics of a (vanished) *Scottish deposit of chalk*:' but geologists demurred to this, and were inclined to think they had been imported as articles of commerce. One correspondent, who is an eminent geologist, thought they had been brought in *coracles* from the north of Ireland, where flint is plentiful. I am now able to state that *they have been deposited by natural agency*, for I have found them in the *stratified gravel*, in a large excavation at Dunragit railway station, and in a gravel pit at Genoch, which is near some of the old beaches where I have found flints, both wrought and unwrought. It is for geologists to discuss whether they have drifted from the north of Ireland

of an ancient river, in which he detected "pieces of *red sandstone* 'of Cambrian derivation'—which make it clear that the higher grounds from which they were borne could not have lain to the S. or E., but *to the N. W. or North.*" From fragments of white sandstone (also found by him), he says, "We may with some probability infer, that the course of the stream (which brought them came from the north, where the great white oolite sandstones rise to the surface."—*Lond. Geol. Soc.*, vol. xxvii. p. 309.

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or some other quarter. For archæologists it is an interesting question whether this deposit of drift contains chipped flints of the palæolithic period. As yet I have found none."

In a paper in the *Proc. Soc. Antiq. Scot.* for 1881, new series, vol. iii. p. 262, I note that these parallel beaches "are also seen in the cultivated fields in the farm of Culmore in Stoneykirk."

The fact that many of the flints are not as large as a pea, led me to think that they were not imported by human agency. After repeated search, I found flints *in situ* in the strata of drift in the gravel pits at Dunragit station at 70 feet level, Genoch at 25, and at other places. This fact explains their presence on the raised beaches and in the bed of streams.

Near Glenluce three successive sea-beaches are marked by three terraces, more or less distinct. The lowest, from 15 to 25 feet above the present sea-level, is well marked in many parts of Wigtownshire, and contains many caves worn in the Lower Silurian rocks. The two higher lines are carried to the north and west of Castle of Park, by sand hills, now cultivated. The second beach is about 60 or 70, and the third about 100 feet above the present sea-level. In the highest the sand is covered by stratified gravel from 3 to 6 feet deep. A fine section is seen in the cutting of the Girvan Railway on West Borland farm. I have found no flints there as yet; but there are pebbles of a soft red sandstone, some of which are larger than I can lift. Such pebbles were sometimes used as whetstones, and for other purposes, by the ancient stone-workers. (A broken valve of a species of astarte was got about three feet below the surface at this section.)

In Kirkmaiden parish I have found *large rolled flints* in the stratified gravel at the sea-beach near Drumore village, and *smaller* ones in two gravel pits near Logan House, about 50 feet above the sea. I got a single flint in the cutting exposed by the road at the side of the lighthouse buildings at the head of the Mull of Galloway, about 200 feet above the sea. They are also to be found in a gravel pit near Lochnaw Castle, about 175 feet above the sea, and at Machar, in Inch, about 75 feet.

The great mass of the stones in our drift beaches and river beds consists of pebbles of grey Silurian sandstone. There are many specimens of granite, chiefly grey. Boulders and pebbles of red

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granite are more frequent further west in the Rhinn district. Quartz and quartzite pebbles are not uncommon. Many of those on the sand hills have been used as hammer stones. There are pebbles of various porphyries and other rocks which would repay examination by trained geologists. I believe some of the materials of our drift have come from Arran. Flint is plentiful *in situ* in Armagh. At Glenluce the drift is not found very far from the sea. The sections at higher levels show much boulder clay. As yet I have seen no flint in the boulder clay.

VII.—*NOTES BY REV. PROFESSOR DUNS ON BOULDERS IN THE ISLAND OF MULL.*

The Convener having learnt that Professor Duns, one of the Committee, had resided during a portion of last summer in Mull, wrote to ask him whether he had taken note of any boulders.

The following is extracted from Professor Duns' answer, dated 27th April:—

"I spent two months in Mull last year, limiting my wanderings to the northern part of the island.

"Perhaps the best answer to your kind note is to copy from my diary the only notes I made on boulders.

"June 3, 1882, *Tobermory.* — Walked to *Mishnish* first lake. Struck into the hills at the burn on the north. A boulder of coarse reddish granite, on the pretty steep slope of the east bank. This is the first '*heathen*' I have seen. None were met with on the moor across which I passed yesterday, lying between the new road to Sorn and the Sound of Mull.

"June 7th.—Yesterday's drive from *Tobermory* to *Torloisk*, and to-day's ramble among the hills between the *Sorn* road and the *Sound*, and chiefly those lying above the *Runa-Gal* lighthouse, correct my note under 3rd current. Both on each side of the road to *Torloisk* and among these hills, granite boulders are numerous, but few are large. They range in size from that of a 'fist' to twice that of the 'head.' A few well sunk in the soil show a surface 2 to 3 feet broad. The granite is for the most part a coarse *reddish* one. But there are some fine grained '*greys*.' The largest met with is gneiss. A small *quartzite* specimen occurs in the same area.

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All are rounded and smooth. Four lie '*en trainée*' widely apart, the line being N. and S.

"June 22nd.—*Tobermory* to more than 3 miles beyond *Calgary*, that is, about 15 miles. As you approach the west coast of North Mull, along this track, the number of boulders gradually decreases, until, say about *Calgary*, I failed to find any in the parts in which I wandered. The contrast is most striking in this respect, between this track and that between *Tobermory*, south-eastward to *Pennygown*, lying at the seaward opening of *Glen-Forsa*. Has ice, moving from the north-west, begun to drop its entangled boulders near the west coast, and the rate of deposit increase as it passed over the track between *Runa-Gal* and *Mishnish*, between *Mishnish* and the S.E. of *Glen Frisa*, and then through *Glen Aros?* Be this as it may, there is no doubt as to the numerical increase of the boulders in this direction. They are all much worn and rounded, and for the most part comparatively small, though some are large enough to have been utilised as gate-posts.

"July 29.—Ascended *Spyon More*, 2435 feet above sea-level. Wandered in search of boulders, of which there are a good many scattered over the hill and on the heights in the immediate neighbourhood;—all, so far as could be ascertained, *granites*—no granite occurring *in situ* in this part of Mull. Four, widely separated, are lying '*en trainée.*' A line drawn from these across the *Sound of Mull*, and over the *Ardnamurchan* hills, would, if extended, pass between *Eigg* and *Rum*. One of them lies on the *very top* of *Spyon More;*—another is met with half-way down the hill. The others lie in the plain out of which the hill rises. The rocks at the summit are well glaciated, and a great heap of moraine-like débris rests on it. Brought away chips from these boulders."

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