LIST OF BOULDERS REPORTED TO ROYAL SOCIETY, ARRANGED BY COUNTIES AND PARISHES.

Aberdeen.

Aberdeen (Town).—In excavating for foundation of house in Union Street, boulder of black sienite, 6 × 5 × 4 feet found. No rock like it *in situ* nearer than Huntly or Ballater, about 30 miles to N.W. or W. Under surface of boulder, striated. The direction of striæ coincides with the longer axis of boulder, viz., about east and west. Preserved, and set up in Court of Marischall College. (Reporter—Professor Nicol.)

Ballater.—On top of Morven, 3000 feet above sea, several granite boulders, unlike rock of hill, and apparently from mountains to west. (Jamieson, "Geol. Soc. Jour.," xxi. p. 165.)

Belhelvie.—Gneiss boulder, about 8 feet diameter, called the "Caple Stone," near parochial school. Rocks *in situ;* near it are granite. (Reporter—Alex. Cruickshanks, Aberdeen.)

Sienite boulder, in a wall, *King Street Road*, about $3\frac{1}{2} \times 2$ feet. The face covered with striæ parallel to longer axis.

Cairney Granite Quarry, 3 miles N.W. of Aberdeen, and about 400 feet above sea. When boulder clay removed, surface of rock found to be smoothed and grooved in a direction E.N.E. and W.S.W. (true.) (Reporter—Alex. Cruickshanks, Aberdeen.)

Bourtie.—1. Four Greenstone boulders, supposed to be Druidical; what is called "The Altar Stone," 16 × 6 × 5 feet, weighs about 18 tons. 2. Boulder, about 20 tons. Longer axis E. and W. Called "Bell Stane," the church bell having once hung from a post erected in it. 3. Whinstone boulder, about 20 tons, on Barra Hill, called "Wallace's Putting Stane," 24 feet in circumference. Legend, that thrown from Bennachie Hill, distant about nine miles to west. 4. Whinstone boulder, called "Piper's Stone." Origin of name given. 5. Whinstone boulder, called "Maiden Stane." Tradition accounting for name. 6. Several Druidical circles described. (Reporters—Rev. Dr Bisset, and Mr Jamieson of Ellon.)

Braemar.—At head of Glen Sluggan, several large erratics. These stand exactly on watershed or summit level. Near shooting-lodge there, a cluster of four or five immense angular granite boulders. They touch one another, and may be fragments of one enormous mass. The adjacent rock is quartz. These blocks situated at end of a long low ridge or mound, which extends from south extremity of Ben Avon Hills, and which strewn thickly over with great granite blocks. The mound composed of a mixed debris of earth and stones, and is apparently a moraine. The adjoining mountain of "Cairn a Drochid" is composed of quartz and granite. On top of it are large granite boulders, many of which situated on quartz rock. (Reporter—Mr Jamieson, Ellon, in letter to convener.)

Chapel Garioch.—Boulder, 19 × 15½ × 11½ feet, weighing about 250 tons above ground. Height above sea 280 feet. Rests on drift. Longer axis E. and W. Legend, that thrown from Bennachie Hill to north-west. The rock of boulder differs from rocks adjoining. Kaims abound in parish. (Reporter—Rev. G. W. Sprott.)

Cruden.—In Boddom Dean, a granite boulder called "The Hanging Stone," measuring 37 feet in circumference and 27 feet over it, resting on several small blocks of granite. Supposed to be Druidical. Half a mile east there is another of 20 tons. (Buchan's Peterhead, published in 1819, and James Mitchell, Boddam.) Huge granite boulder, called "The Gray Stone of Ardendraught," broken up in 1777 to build walls of Parish Church. It was the stone on which "Hallow" fires* used to be lighted. (Jamieson, "Geol. Soc. Jour.," xiv. p. 525.)

At Menie Coast Guard Station, granite boulder, 54 feet in circumference and 7 feet above ground; also a greenstone

* "Hallow" fires were lighted on 31st October, and were called "Saimh-theine." The "Beil-theine" fires were lighted on 1st May. These practices, formerly general in the Highlands of Scotland, were probably connected with the worship of the sun, whose departure in autumn, and return in spring, were signified by these rites. The Rev. Mr Pratt published an account of Buchan in the year 1858, and states (page 21), "Hallow fires are still kindled on the eve of All Saints, by the inhabitants of Buchan—from sixty to eighty fires being frequently seen from one point." (*Old Stat. Acct. of Scotland*, vol. xi. p. 621, and vol. xii. p. 458.)

boulder, 78 feet in circumference and 6 feet above ground. (Jamieson, "Geol. Soc. Jour.," xiv. p. 513.)

Near the "Bullers of Buchan," there stands "The Hare or Cleft Stone," which marks the boundary between the parishes of Cruden and Peterhead. Granite 9 × 8 feet, 160 feet above sea. (Pratt's "Buchan," 1858, page 47, and James Mitchell, Boddam.)

In this parish, and to north, numerous mounds and ridges of gravel, called at one place "Hills of Fife," at another, "Kippet Hills." The generic name of these mounds and ridges in this part of Scotland, is Celtic word "Druim" or "Drum." They are composed sometimes of sand, more frequently of gravel. The gravel consists of fragments of rock, generally from westward. They are always well rounded, by the friction they have undergone. They sometimes reach a size of 2 feet in diameter. The pebbles are chiefly gneiss.

On top of some of the knolls and ridges there are large boulders. There is one, near Menie, being a coarse crystalline rock, with a greenish tint, 8 × 5 feet. Another boulder of greenstone lies near it. Very frequently a stratum of red clay lies over the gravel ridges, encircling the base of boulders, indicating that after the gravelly ridges had been formed, and the boulders deposited, muddy sediment had been deposited in deep water. (Jamieson, "Geol. Soc. Journ.")

The following additional information sent by Mr James Mitchell, Boddam:—

No. 1 boulder, in a ravine at Bullers of Buchan, granite, 14 × 8 × 5 feet. About 15 feet above sea.

No. 2 boulder, on confines of Cruden and Peterhead. Granite, 18 × 12 × 5½ feet (above ground), 290 feet above sea.

No. 3, half a mile to E. of No. 2, a granite boulder, 13 × 9 × 5 feet, at a height of 260 feet above sea.

Along the south side of Peterhead Bay, and as far as Buchan Ness, the shore is strewed with blocks of granite, gneiss, trap, and sandstone; many of them belonging to rocks not found nearer than 20 or 30 miles.

A belt of gravel and calcareous sand forms a semicircular arc, with a radius of about 3 miles from the coast, passing

through Crudens and Slains. The most conspicuous hillock in the line is a narrow Kaim in Slains parish, called the *Kipet Hill*,—the abode of fairies and elf bulls.

Compact groups of boulders form lines generally in a N.E. and S.W. direction. But a large number have been sown broadcast.

Culsalmond (Garioch).—Boulder of blue gneiss, $6\frac{1}{2} \times 2\frac{1}{2}$ feet, known as the Newton Stone, containing Ogham and other very antique inscriptions. (Professor Nicol in letter to Convener.)

Ellon.—At junction of Ythan and Ebrie, sienitic greenstone boulder, $22 \times 9\frac{1}{2} \times 8\frac{1}{2}$ feet, resting on gneiss. Near same place, another still larger. All these boulders have come from W. or W.N.W. (Jamieson, in letter to Convener.)

Glass (5 or 6 miles west of Huntly).—Five blocks called "*Clachan Duibh*" (Black Stones), on Tod Hill. Girth of each about 50 feet, and height from 10 to 12 feet. Being of same rock as hill, not certain whether brought from a distance. Other boulders on hill apparently different from adjoining rocks. Height above sea about 1000 feet. (Reporter—J. F. Macdonald, parochial schoolmaster.)

Kemnay.—Boulder, $38 \times 30 \times 10\frac{1}{2}$ feet, about 300 feet above sea; longer axis, E. and W. Boulder, $35 \times 30 \times 10$ feet, about 325 feet above sea; longer axis N. and S. Boulder, $25 \times 23 \times 8$ feet, about 325 feet above sea; longer axis, E. and W. Boulder, $28 \times 25 \times 8$ feet, about 325 feet above sea; longer axis N. and S. Boulder, $30 \times 28 \times 10$ feet, about 360 feet above sea; longer axis, N. and S. Boulder, $33 \times 27 \times 6$ feet, about 360 feet above sea; longer axis, N. and S. Boulder, $21 \times 20 \times 3$ feet. All these boulders are blue gneiss, whilst rocks adjoining are a coarse grey granite. On Quarry Hill, situated to north, 600 feet above sea, the rocks show striations indicating movement from west. Kaimes in valley parallel with valley running N.E. and S.W. for two or three miles. Legend, about devil throwing boulders at church from Bennachie Hill, situated to N.W. about eight miles. See ballad in Report. (Reporter—Rev. George Peter, M.A., parish minister.)

Logie Coldstone.—This parish thirty miles N.W. of Aberdeen. Surrounded at N.W. by amphitheatre of hills, of which

Morven 2850 feet high. It contains numerous mounds of gravel and sand, in layers, showing action of water. They have the form of "kaims." Though there are no boulders, there are pebbles up to a *cwt.* or more, imbedded in water-worn gravel and fine sand. The pebbles are of same rock as adjoining hills—gneiss, granite, and hornblende. Two singularly shaped mounds, one 60 feet high, the other composed entirely of sand. They resemble the terminal moraines seen in the Grindelwald and other parts of Switzerland. Some years ago a number of boulders (from 3 to 6 tons in weight) were destroyed at a place situated to the north of this. They were of a soft, bluish granite, differing from any granite rock within a distance of nine or ten miles. One of these boulders might weigh 20 tons. This place had all the appearance of an ancient lake. The boulders may have been brought to it by same agency as that now seen on the Märjelin See, near Aletsch Glacier. (Reporter—J. G. Michie, schoolhouse, Coldstone, Tarland.)

New Deer.—A great number of boulders, from 1 cwt. to several tons, lie in a sort of line for more than a mile S.E. from farm of Green of Savoch, as far, at least, as the hill of Coldwells and Toddlehills, in parish of Ellon. Elsewhere they are mostly on surface. Locally called "Blue Heathens." On Whitestone Hill, Ellon, and on Dudwick Hill, chalk flints are exceedingly abundant. (Reporter—James Moir, Savoch, by Ellon.)

In this parish formerly there was a rocking-stone, called "The Muckle Stone of Auchmaliddie." On the Hill of Culsh, formerly a Druidical circle. About seventy years ago the stones were carried away to aid in building a manse. Farm where situated still called, "The Standing Stones of Culsh." (Rev. J. Pratt's Account of Buchan, 1858.)

Towie.—Stone of unhewn granite, standing about 7 feet above ground, on north side of river Don, near bridge. Supposed to be Druidical ("New Statistical Account" of parish).

Argyll.

Appin.—Granite boulder 20 × 18 × 11 feet, about 290 tons. Differs from adjoining rocks. Longer axis N.E. Striated. Apparently has come from head of valley, which to N. or N.E. There is also a line of boulders;—rocks striated in direction of glen. (Reporters—James M'Dougall and Sir James Alexander, who sends a sketch.)

Ardentinny.—1. Boulder, called "Pulag"* (Big Round Stone), about 30 tons. In critical position on edge of cliff. 2. Boulder, called "Giant's Putting Stone," pear-shaped, and rests on small end. 3. Boulder, called "Clachan Udalain" (nicely-balanced stone), larger. (Reporter—Rev. Robert Craig.)

Duncansburgh (near Kilmallie).—Granite boulder, 7 × 5½ × 5 feet, called "Trysting Stone." Tradition. There are larger boulders nearer Ben Nevis. (Reporter—Patrick Gordon, min., *Q. S.* Duncansburgh, Fort-William.)

Dunoon (Kirn).—Trap boulder, 21 × 14 × 7 feet, about 164 tons. The adjoining rocks are mica schist and clay slate; striated. Photograph sent. (Reporter—Rev. James Hay, minister of Kirn.)

Glencoe.—Trap boulder, about 90 feet in girth and about 10 feet high. It is nearly round, and lies on an extensive flat, so that very conspicuous from a distance. (Reporter—Captain White, R.E.)

Inishail (North of Inverary).—Granite boulder about 8 feet above ground, called "Rob Roy's Putting Stone," about 1 mile from Taynuilt Inn on Oban road, about 60 feet above sea. A mountain of same rock about 1 mile distant. Longer axis, E. and W. Due west from above about 1½ miles, another boulder on a ridge on side of Loch Etive, in Muckairn parish. Several large boulders on road between Dalmally and Tyndrum; also on road between Tyndrum and Black Mount, about 4 or 5 miles from Tyndrum. A fine boulder on Corryghoil farm (Mr Campbell) between Inishail and Dalmally. (Re-

* Another translator states that "*Pulag*" in Gaelic means a "*dome*"

porter—Rev. Robert M. Macfarlane, minister of Glenorchy and Inishail).

Inverchaolain.—Gneiss boulder, 10½ × 7 × 5½ feet, about 30 tons. Called "Craig nan Cailleach" (Old Wife's Rock). Differs from rocks of district. At head of Loch Striven, many boulders, same as rocks. (Reporter—John R. Thompson, schoolmaster, Inellan.)

Iona (Island).—Granite boulder, 24 × 18 × 6 feet, 190 tons. Longer axis N.W. There are a great many others, chiefly on E.S.E. side of island, opposite to Ross of Mull, from which boulder supposed to have come. On other hand, Duke of Argyll is said to consider that the granite of the boulder is not the same variety as that of Ross. There are several boulders oddly placed near top of highest hill on N.W. side. (Reporter—Allan M'Donald, parish schoolmaster.)

Kilbrandon (Easdale by Oban).—On Lord Breadalbane's estate, grey granite boulders from 21 to 28 feet in girth, and standing from 3 to 4 feet above ground. Longer axis generally N.W. Ruts or grooves on tops and sides of some, bearing N.W. These boulders sometimes single, sometimes in groups, sometimes piled on one another. Occur at all levels from shore up to hill tops. No granite *in situ* nearer than Mull, which is 15 or 20 miles distant to N.W. (magn.) (Reporter—Alexander M'Millan, schoolmaster, Kilbrandon.)

Kilmallie.—Boulder, 12 × 10 × 10 feet, about 100 tons. There is another, said to be larger, in the distant moors; also quartz boulder, about 9 feet square, supposed to have come from Glenfinnan, about 15 miles to N.W. by W. (Reporters—Rev. Arch. Clerk, and C. Livingston, schoolmaster.)

Kilmore and Kilbride (near Oban).—Granite boulder, 12 feet long; diameter of shortest axis, 5 feet; longer axis, E. and W. A few feet above sea mark. Adjacent rocks conglomerate. Another stone, about 200 yards distant, called "Dog Stone," of which photograph sent. It is a conglomorate. (Reporter—C. M'Dougall, Dunollie, Oban).

Lismore (Island of).—Boulders of granite, red and grey, lie on the limestone rocks of the island. An old sea terrace described, as encircling the island, on one part of which a cave, from the

crevices of which shells picked by Reporter (Alexander Carmichael, Esq., of South Uist, Lochmaddy, who refers also to the Rev. Mr Macgrigor, minister of Lismore).

Saddell (Kintyre).—Several small granite boulders, though there are no granite rocks in Kintyre. A good many whinstone standing stones. (Reporter—Rev. John G. Levach, Manse of Saddell.)

South of Campbelton, many granite boulders, like Arran granite, one near Macharioch, 4 × 5 × 2 feet. (Reporter—Professor Nicol, Aberdeen.)

At Southend, a boulder of coarse grey granite, about 18 feet in circumference, and weighing more than 3 tons, now broken up.

Another granite boulder, about 12 feet in circumference.

Two boulders of sienite, each 2 or 3 tons, about 200 feet above sea.

No granite rocks in neighbourhood. Rocks chiefly limestone and red sandstone. (Reporter—D. Montgommerie, Southend parish school.)

AYR.

Coylton. — Granite boulder, 11 × 7½ × 5 feet, about 30 tons. Longer axis N. and S. There are four more boulders, about 4, 8, and 12 tons. They form a line running N. and S. Legend, that King Coil dined on large boulder. (Reporter—Rev. James Glasgow.)

Dailly.—Granite boulder about 36 tons on Killochan Estate, called "The Baron's Stone." About 100 feet above sea. Lies on Silurian rocks. Apparently derived from granite hills situated S.S.E., near Loch Doon, about 13 miles distant. Boulder proposed to be blown up by tenant of farm. But old inhabitants interposed, and an inscription put on it by proprietor, Sir John Cathcart, in these terms, "The Baron's Stone of Killochan." Granite boulders of various sizes, on hill slopes, south of river Girvan. One on Maxwelton farm 800 feet above sea, contains 240 cubic feet. Another, 16 feet long, on top of Barony Hill above Lannielane, mostly buried under turf. Level mark on it by Ord. surveyors of 1047 feet above sea.

Doone Loch.—Two miles south of,—a granite boulder, about 25 × 20 × 12 feet, called "Kirk Stane." (Seen by Convener.)

Girvan.—Thousands of granite boulders for miles along shore near Turnberry Point, and some whinstones. Rocks *in situ* sandstone. (Reporter—Superintendent of Turnberry Lighthouse works.)

Along coast 4 miles south, in a ravine, two boulders of altered Greywacke. Largest, 17 × 13 feet, and weighs 180 tons. Other weighs about 100 tons. Have probably come from hills to S. or S.E.

Maybole.—Granite boulder, flat and oblong, on slope of hill above river Doon, on Auchindrane, at height of 230 feet, known as Wallace's Stone, from tradition, that a rude cross carved on it represents the sword of that hero. (These cases from Dailly, Girvan, and Maybole, communicated by Professor Geikie).

Banffshire.

Banff.—In district between Banff and Peterhead, beds of glacial clay, of a dark blue colour, very similar to beds in Caithness, and probably drifted from Caithness. Near Peterhead, many boulders of granite and trap. One of these, $4\frac{1}{2} \times 2\frac{1}{2} \times 1$ feet, a fine grained tough trap, of a greenish colour, not known *in situ* in Aberdeenshire, but occurs in Caithness. (Jamieson, "Geol. Soc. Jour.," xxii. p. 272.)

Boyndie.—Hypersthene boulders along shore, and found for some miles running S.W. Supposed to have come from rock to S.E., called "Boyndie Heathens." (Reporter—James Hunter, Academy, Banff.)

Fordyce.—A line of boulders can be traced running through parishes of Ordiquhill, Marnock, Grange, Rothiemay, and Cairney, in a direction S. and N. The boulders are a blue whinstone. In Ordiquhill parish, boulders, so close as to almost touch. They are called "Heathens." 500 feet above sea. (Reporter—Parish minister.)

Caithness.

Dunnet.—Conglomerate boulder of small size, apparently from "Maiden Pap" Hill, thirty miles to south. Several large

boulders in parishes of Olrich and Cannesby. (Reporter—Robt. Campbell, parish schoolmaster.)

Thurso.—Near Castletown, large granite boulder, which supposed to have come from Sutherland.* Between Weydale and Stonegun, several large conglomerate boulders.

Wick.—Three large boulders, differing from adjoining rocks, weighing from 20 to 60 tons. One is a conglomerate, apparently from mountains twenty miles to south.† (Reporters—John Cleghorn and J. Anderson.)

Granite boulder, 12 feet long, in drift, striated. Fragments of lias, oolite, and chalk flints, in same drift. Striations of rocks and boulders in Caithness indicate a general movement from N.W., *i.e.*, from sea.

Dumfries.

Kirkconnell.—Granite boulder, about 9 feet diameter, 20 to 30 tons; 700 feet above sea, called "Deil's Stone." Differs from adjoining rocks. Granite rocks in Spango Water, about three miles to north. (Reporter—R. L. Jack (Geolog. Survey).)

Tynron.—Three whinstone boulders, each weighing from 20 to 30 tons; also several conglomerate boulders. All have apparently come from N.W. (Reporter—James Shaw, schoolmaster, Tynron, Thornhill.)

Wamphray.—Large whinstone boulder. King Charles II. halted with his army and breakfasted here. (Reporter—Parish minister.)

Edinburgh.

Arthur Seat.—On west side of, boulders of limestone, supposed to have come from west. Rocks at height of 400 feet above sea, smoothed and striated in direction N.W.

Between Arthur Seat and Musselburgh, boulders smoothed and striated. Striæ run from N.W. and W.N.W. (Roy. Soc. of Ed. Proceedings, vol. ii. p. 96.)

* Rev. Mr Joass, of Golspie, states that granite occurs at a less remote locality.

† Rev. Mr Joass states that conglomerate rock occurs to the westward at a less distance.

Pentland Hills.—1. Mica-slate boulder of 8 or 10 tons. Supposed by Mr Maclaren to have come from Grampians, 50 miles to N., or from Cantyre, 80 miles to W., about 1400 feet above sea. 2. Greenstone boulder, 12 or 14 tons. Nearest greenstone rock *in situ*, 500 or 600 feet lower in level to N.W. 3. Sandstone boulder, about 8 tons, differing from adjacent rocks. (The above mentioned in Maclaren's "Fife and Lothians," p. 300.) 4. Greenstone boulder, about 10 tons, near Dreghorn. (Fleming's "Lithology of Edinburgh," p. 82.)

West Calder.—Whinstone boulder, 8 × 7 × 7 feet, about 28 tons. Adjoining rocks are sandstone. (Reporter—S. B. Landells, teacher.)

Elgin.

Dallas.—Numbers of small granite boulders found here, which supposed to have come from Ross-shire.

Duffus.—On Roseile Estate, conglomerate boulder called, "Hare, or Witch's Stone," 21 × 14 × 4 feet, longer axis N.W. Farm named "Keam," from being situated on a sandy ridge.

Elgin.—1. Conglomerate boulder on Bogton farm, 4 miles south of Elgin, 15 × 10 × 8 feet, about 80 tons. Longer axis is E.N.E., called "Carlin's Stone." Also a smaller one, called the "Young Carlin," to N.W. about half a mile. 2. Conglomerate boulder, 4 × 4 × 3 feet, about 3 tons. 3. Gneiss boulder, 13 × 8 × 6 feet, about 46 tons, called "Chapel Stone." Situated west of Pluscardine Chapel. 4. Sienite boulder, 12 × 8 × 3 feet, about 13 tons. 5. Sienite boulder, 8 × 6 × 2 feet, about 7 tons. The rocks *in situ* are all Old Red Sandstone. On Carden Hill, rocks smoothed and striated;—the direction of striæ N.W. (Reporter—John Martin, South Guildry Street, Elgin.)

Forres.—Conglomerate boulder, $9\frac{1}{2}$ × 8 × 8 feet, about 44 tons, called "Doupping Stone." (Reporter—John Martin.)

Llanbryde, St Andrews.—Gneiss boulder, 15 × 9 × 7 feet, about 70 tons, in bed of old Spynie Loch, called "Grey Stone;" longer axis is N.N.E. and S.S.W. (Reporter—John Martin.)

New Spynie.—Four conglomerate boulders, lying on Old Red Sandstone rocks. (Reporter—John Martin.)

Rothes.—Six hornblende boulders, lying on gneiss rocks; dimensions and positions given. (Reporter—John Martin.)

FIFE.

Balmerino.—Mica schist (?) boulder, 12 × 9 × 8 feet; destroyed some time ago. (Reporter—James Powrie, Esq., Reswallie, Forfar.)

Crail.—Granite boulder, 10 × 8 × 6 feet, called "Blue Stone o' Balcomie," close to sea margin at East Neuk. Also trap boulder, 12 × 8 × 7½ feet. (Reporter—Captain White, R.E.)

Dunfermline.—Whinstone boulder, 17 × 15 × 6 feet, about 114 tons, called "Witch Stone." Legend. (Reporter—Robert Bell, Pitconochie.)

Leslie.—Kaim of sand and gravel near village, 100 to 300 feet wide, and 20 feet high, cut through by a brook. (Reporter—John Sang, C.E., Kirkcaldy.)

Newburgh.—On shore, near Flisk point, boulder of sienitic gneiss, about 15 tons. Legend is, that a giant who lived in Perthshire hills flung it at Flisk church. (Dr Fleming, "Lithology of Edinburgh," p. 83.)

West Lomond.—Hill about 1450 feet above sea, boulder of red sandstone and porphyry lying on carboniferous limestone. (John Sang, C.E., Kirkcaldy.)

FORFAR.

Airlie.—A remarkable kaim running two miles eastward from Airlie Castle. (Reporter—Daniel Taylor, schoolmaster.)

Barry.—Granite, sienite, and gneiss boulders and pebbles, on shore, and also on raised beaches, 11 and 45 feet respectively above sea level. (Reporter—James Proctor.)

Benholm.—Huge granite boulder, called "Stone of Benholm," now destroyed. Boulders on sea shore, of granite and gneiss, many of which are supposed to have come out of the conglomerate rocks, which occur here *in situ*. One boulder 18 × 12 × 3 feet, another 12 × 6 × 4 feet. "Stone of Benholm," stood on apex of a Trap knoll. The Trap knoll presents a surface of rock, which has apparently been ground down and smoothed by some agent passing over it from west; the exact line of move-

ment seems 10° to 20° south of west (magn.) In this Trap knoll there are agate pebbles, which have been mostly all flattened on west side, and been left steep and rough on east sides. Small hills which range in a direction north and south are scalloped, as if some powerful agent passing over them from westward had scooped out the softer parts. Hills ranging east and west, form a ridge with a tolerably level surface. Gourdon Hill and Craig Davie show marks of great abrasion. (Reporter—Rev. Mr Smart Myers, parish minister.)

Carmyllie.—Granite or gneiss boulder, from 7 to 10 tons. Differs from rocks near it. It lies on a height. Called "The Cold Stone of the Crofts." Supposed to have come from hills thirty miles to north. (Reporter—Rev. George Anderson.)

Cortachy.—Whinstone (?) boulder, 13 × 10 × 8 feet, about 78 tons. Longer axis E. and W. Supposed to have come from a trap dyke situated to N.W. Legend, that thrown from N.W. (Reporter—Rev. Geo. Gordon Milne.)

Mr Powrie of Reswallie reports a mica schist boulder as situated in South Esk river, about 60 or 80 yards below bridge, and within Earl of Airlie's park. Parent rock supposed to be 2 or 3 miles to N.W. This boulder probably same as that mentioned by Rev. Mr Milne.

Farnell.—Boulder $9\frac{1}{2} \times 7\frac{1}{2} \times 2\frac{1}{4}$ feet, about 12 tons. Supposed to have come from N.W. about thirty miles. (Reporter—Rev. A. O. Hood, parish minister.)

Inverarity.—Two grey granite boulders, from 2 to 5 tons each; destroyed some time ago. (Reporter—Rev. Patrick Stevenson.)

Kirkden.—Kaims, 440 paces long, running E. and W.; slope on each side from 22 to 30 paces; composed of gravel and sand. (Reporter—Rev. James Anderson.)

Kirriemuir.—A number of granite boulders in centre of parish, both grey and red. They lie chiefly between Stronehill and Craigleahill. Supposed to have come from Aberdeenshire.

Two kaims on Airlie Estate, one 100 yards long and 30 feet high, N.W. and S.E. on Upper Clintlaw Farm; other on Mid Scithie Farm, about 200 yards long and 30 feet high. At south base of Criechhill, a group of kaims, apparently

caused by confluence of great streams from N.E. and N.W. glens.

Old Red Sandstone rocks in S. of parish. Igneous rock towards N. at Craigieloch.

Slate rocks in Lintrathan and Kingoldrum. (Reporter—David Lindsay, Lintrathan, by Kirriemuir.)

Liff.—1. Mica schist boulder, 8 × 6 × 4 feet, called "Paddock Stone." Legend. Longer axis, N. and S. One report bears that it is whinstone, and may have come from Pitroddie Quarry, fourteen miles west. 2. Two boulders of mica schist, each 8 or 10 tons, called "Gows of Gowrie," noticed by Thomas the Rhymer. 3. A Druidical circle of nine large stones—three mica schist, one granite, five whinstone. Central stone, longer axis N. and S. (Reporters —James Powrie, Esq., Reswallie, Forfar; P. Anthony Anton, St Regulus Cottage, St Andrews.)

Menmuir.—1. Granite boulder, 14 × 9 × 4 feet, about 36 tons. Longer axis N. and W. Striated. Called the "Witch Stone." 2. Granite boulder, 13 × 9 × 4 feet, about 34 tons. There are many others smaller. (Reporter—Rev. Mark Anderson, Menmuir, Brechin.)

Montrose.—On Garvock and other hills, striæ on rocks point W. by N., *i.e.*, obliquely across the hills, which range W.S.W. and E.N.E.

On Sunnyside Hill, pieces of red shale found, derived from rocks *in situ* many miles to N.W. at a locality 100 feet lowest level.

Large blocks of gneiss, several tons in weight, occur, which must have come from Grampians, many miles farther to west. (James Howden, "Edin. Geol. Soc. Trans." vol. i. p. 140.)

Rescobie.—Mica slate boulder, 13 × 7 × 7 feet, near top of Pitscandly Hill, lying on drift. Rocks *in situ* Old Red Sandstone. Sir Charles Lyell says it came from Creigh Hill, about seventeen miles to W.N.W. Longer axis N. by E. 550 feet above sea. Valley of Strathmore lies between boulder and parent rock, and there are several hills also between boulder and parent rock, higher than boulder. Many smaller boulders of old rocks on same hill. (Reporter—James Powrie, Esq., Reswallie, Forfar).

St Vigeans.—Gneiss boulder, now destroyed. Supposed to have come from mountains situated to N.W. If so, it had to cross valleys and ridges of hills. Kaims in parish full of granite and gneiss boulders. (Reporter—Rev. William Duke, minister.)

HEBRIDES.

Barvas.—On Estate of Sir James Matheson, a monolith, called *Clach an Trendach*, or "Gathering Stone." Height above ground, 18 feet 9 inches, and girth 16 feet. (Reporter—Rev. James Strachan.)

Harris.—A large boulder on a tidal island, broken into two fragments, 100 feet apart. (Reporter—Alex. Carmichael.)

North Uist.—On a small island called Cāneum, north of Lochmaddy Bay, there are two boulders of Laurentian gneiss, which, though 100 feet apart, are evidently the two fragments of one block. The rocks *in situ* are also gneiss; but there is no hill or cliff near, from which the block could have fallen or come. One boulder weighs about 15, the other about 50 tons. They are both on the sea-beach, with a ridge or isthmus of rock between them. The boulders have each a side—in the one concave, and in the other convex—which face one another, and correspond exactly in shape and size. The edges of these two sides (viz., the convex and concave) are sharp, whereas the other sides in both boulders are rounded, suggesting that the original block had undergone much weathering or other wearing action before being fractured. The larger boulder rests fantastically and insecurely on two smaller blocks. Reporter thinks the boulder brought by ice, and that it fell from a height, and was split by the fall.

In Long Island the hills even to the summits are covered with blocks and boulders. As a rule the edges of these are sharp, whereas the native rock, whether low down or high up, is glaciated, grooved, and striated to a very remarkable degree. The best places to see these marks are where drift, covering them, has been recently removed. They are obliterated in the rocks, which have been much weathered. (Reporter—Alex. Carmichael, Esq., South Uist, by Lochmaddy.)

The Lewis.—(Q. S. Parish of Bernera. On farm of Rhisgarry, be

longing to Lord Dunmore.) Gneiss boulder, $8\frac{1}{2} \times 7 \times 3$ feet. Longer axis N. and S. 30 feet above sea. Striated N. and S. Striæ from 2 to 4 feet long. Same rock as those *in situ*. Called "Craig nan Ramh." (Reporter—Rev. Hugh Macdonald, Manse, Bernera.)

The Lewis (Stornoway, Tolsta).—A rocking stone of gneiss $12 \times 5 \times 4\frac{1}{2}$ feet. Longer axis N.W. and S.E. About 200 feet above sea. Rocks *in situ* also gneiss. There are boulders of trap, apparently brought from eastward, where there are trap dykes. At a corner of a rocky hill near Tolsta, there are huge pieces of rock lying, suggesting idea of having been broken off by an iceberg. On Park Farm, beside a loch, there is a solitary boulder. Near Stornoway Tile Works, a boulder of Cambrian rock, supposed to have come from mainland to eastward. (Reporter—Mr Peter Liddell, Gregs, by Stornoway.)

Stornoway.—Several boulders occur near Garabast, of a rock similar to that which exists at Gairloch, on mainland to east (about 35 miles across the sea). There is also a large standing stone at Paible. (Reporter—Henry Caunter, Esq., Stornoway.)

In Forest of Harris, and beween Fincastle and Glen Ulledale, there are many evidences of (supposed) ice action, viz., rocks smoothed and striated, and boulders lying in lines. (Reporter—Capt. Thomas, R.N.)

Report by Mr Campbell of Islay.

The well-known author of "Frost and Fire," who has studied the subject of the transport of boulders, not only in Scotland, but in many foreign lands on both sides of the Atlantic, has sent to the Committee a report, from which the following extracts are made:—

"I find in Scotland, upon ridges which separate rivers, marks of glaciation upon a large scale. These enable me to say, with tolerable certainty, that the ice which grooved rocks in the Outer Hebrides, at low levels, near sounds, moved from the ocean in the direction which tides now follow in the straits beside which the striæ are found.

"The conclusion at which I have arrived, by the examination of all these phenomena, boulders included, is, that a system of glaciations prevailed in Scotland, which can be ex-

plained by the system now existing in Greenland. There, a vast system of Continental ice, as great in area as all India, radiates seawards, and launches icebergs, which move about in tides and currents. This system certainly existed in Scotland previous to the smaller system.

"Following any glen in Scotland, say Glenfyne, the smaller system of glaciation follows the course of the river (as in Switzerland), and the course of the tides in the sea loch (as glaciers do in Greenland); and, furthermore, often overruns low watersheds, and runs out to sea in some direct line. The striæ which mark the run of ice from the head of Glenfyne to Lochgilphead, run over a col and down Loch Killisport. They run past Tarbert, down both sides of Ceantyre and Arran, and out to sea. At Ormsary, by the roadside, and on the sea-beach, is a train of large boulders to which the usual legends are attached. One was thrown from Knapdale at a giant who was eating a cow on the other side of the loch. One of these boulders close to Ormsary House, at a small roadside cottage, is the biggest I have seen in Scotland. I did not try to ascertain whence it came. I think it was pushed a short distance only. But the striæ and trains of blocks show that it moved from N.E. to S.W. along the general line of hollows in the Western Highlands.

"On the outer islands in Scotland are marks equivalent to those so conspicuous on shore. In the Long Island, from Barra Head to the Butt of Lewis, the whole country glaciated, and the boulders everywhere perched upon the hills. Where surface newly exposed, the striations and smooth polishing so perfect and fresh, that marks can be copied as *brasses* are copied in churches by antiquaries. I showed to you samples taken last year in Barra and Uist. I have a large series taken wherever I have wandered. These enable me to say, with tolerable certainty, that the ice which grooved rocks in Outer Hebrides at low levels, near sounds, moved from the ocean in the direction which tides now follow in the straits, beside which the striæ are found. For example, the grooves upon the flat at Iochdar, at the north end of South Uist, aim directly at the Cuchullin Hills in Skye. At the Mull of Ceantyre, at a

great height above the sea, grooves aim at Rhinns of Islay parallel to the run of the tides. And so it is at a great many other places all round the coast."

In a letter from the same gentleman to Mr Carmichael, of South Uist, dated 29th March 1872, the following passages occur :—

"Glacial striæ occur upon fixed rocks in Tiree, Minglay, Barra, South and North Uist. They correspond with a direction from the N.W., or thereabouts.

"The striæ abound, and are especially fresh in the low levels, and opposite to hollows in hills, which would be under water, and traversed by tides, if those levels were now to sink a few hundred feet. The hills, so far as I have examined them, are ice-worn to the very top. Transported blocks are scattered all over these islands. In some places regular boulder-clay is left in patches. Under the clay, the rocks are smooth as polished marble. The boulders, so far as I have been able to ascertain, are of the same rock as the rock of the islands named. Boulders in Tiree, for example, may have come from Uist or Barra. They are perched upon the highest hill-top in Tiree.

"I was unable to find any sample of the rocks of Skye in Uist or in Tiree."

INVERNESS.

Kilmallie.—Boulder, fully 2000 feet above sea, on summit of a hill, 12 × 10 feet. Another still larger among the mountains between Loch Shiel and Loch Arkaig. Also boulder drifts and moraines in numbers. (Reporter—Rev. Archibald Clerk, Kilmallie Manse.)

Kilmallie (near Ardgour).—Quartz and mica boulders, nearly round, and remarkable on bare hill side. Different from adjacent rocks. 110 feet above sea. Same kind does not occur nearer than Glenfinnan, situated fifteen miles to N.W. by W. (Reporter—C. Livingston, parochial schoolmaster.)

Kilmonivaig (Glengarry, N.W. of Fort William), Estate of Edward Ellice, M.P.—Boulder on Monerrigie Farm, near Lochgarry, about 16½ feet long at base, and 23 feet at top, and about 9 feet high. Round at top. Quartzite rock. No rock *in situ* near.

Longer axis N. and S. Several boulders on Leek Farm, near Loch Lundie, considerably larger. Some of boulders examined by Mr Jolly, school inspector, Inverness, and found by him to be striated. On Faicheam Ard Farm boulders very peculiar, being entirely different from all rocks in neighbourhood. Have been objects of curiosity to many geologists. The boulders generally arranged in groups, except at Faicheam Ard, where piled on one another. They rest on gravel. At Leek, near Iron Suspension Bridge, rocks *in situ* well striated.

There are "kaims" in another part of parish. At mouth of Glengarry a delta of fine gravel. In Lochaber also, along banks of Spean and Lochy. (Reporter—Parochial Schoolmaster.)

Kiltarlity (on Lord Lovat's lands).—A group of boulders called whinstones. Rock of same kind "a little southwards." Dimensions of two largest are (1.) 15 feet long, 9 feet high, 10 feet broad; (2.) 8 feet long, 6½ feet high, 13 feet broad. Longer axis of both E. & W. Angular in shape. Several natural ruts on both 4 or 5 feet long, running N.W. About 300 feet above sea. (Schoolmaster's schedule, but omitted to be signed.)

Kingairloch (near Fort William).—Boulder, 5 × 5 × 4 feet, about 5 tons; 8 feet above sea. Different from adjacent rocks. (Reporter—D. Cameron, teacher.)

Kingussie.—Boulder of a slaty rock, 15½ × 12 × 9, about 120 tons. Longer axis, E. & W. Called "Fingal's Putting Stone." About 900 feet above sea. Several other large boulders near Laggan Free Church. (Reporter—Cluny M'Pherson, Cluny Castle, Kingussie.)

Lochaber.—Near summit of Craig Dhu, between Glens Spean and Roy, a black sienite boulder, 14 × 8 × 4 feet. On same hill lower down, boulders of red granite and felspar. (Observed by Professor Nicol and Mr Jamieson of Ellon. Mr Jamieson states that parent rock is in Glen Spean, to S.E. of Craig Dhu, and at a level far below boulders.) ("Lond. Geol. Soc. Journal," Aug. 1862 and Aug. 1863.)

On second Glenroy shelf, near the "Gap," a boulder of sienite, 8 × 7 × 4 feet. (Reporter—Professor Nicol.)

Morvern (near Fort William).—Grey granite boulder, called "Clach na'm Buachaillean." Length—North side, 17 yards; south side, 7½ yards; 17 yards "round about;" 13 yards "round top from ground to ground;" 11½ yards "across middle from ground to ground." A large boulder to east of above on a hill about 2640 yards distant, and "peculiarly laid upon other smaller stones." (Schoolmaster's schedule, but omitted to be signed.)

KINCARDINE.

Banchory.—On property of John Michell, Esq. of Glessel, not far from Glessel Railway Station, a boulder called the "Bishop's Stone;" circumference 44 feet, height above ground 8 feet, estimated to weigh 70 tons; bluish granite, differing from adjoining granite rocks. An ancient stone circle of boulders about 200 yards distant. (Reporter—Sir James Burnett of Crathes.)

The hill of Farre, situated two miles to north, forms an elongated range, running E. and W. Rocks on it glaciated, the striæ running about E. and W., *i.e.*, nearly coincident with valley of Dee. (Reporter—Thos. F. Jameson, Ellon.)

Fettercairn.—No boulder now left in parish, of any size. Long banks of gravel and sand occur, running parallel to one another. (Reporter—A. C. Cameron, parish schoolmaster.)

Maryculter.—Boulder, 5½ × 6 × 6 feet, about 14 tons. Longer axis N. and S. Rock of boulder considered same as rock situated to eastward. (Reporter—David Durward.)

KIRKCUDBRIGHT.

Galloway.—A great accumulation of blocks at head of Loch Valley at Loch Narroch. Among these are blocks of the peculiar graphic granite of Loch Enoch to the north, so that these blocks must have been carried from Loch Enoch southwards into the basin of Loch Neldricken, on to the spur of Craignaw between it and Loch Valley, and still onwards right over Craiglee and its deep scooped lake basins into Glen Trool. Craiglee is remarkable for the number of perched blocks, some of immense size, scattered over its ridges and highest peaks.

The many boulders along its ridgy crest give the appearance of an old broken-toothed saw.

Throughout the whole region travelled blocks and boulders occur, even to the summit of the Merrick, the highest peak south of the Grampians (2764 feet). One set of perched blocks is interesting, viz., poised blocks, known as Rocking Stones. Such blocks are natural, and have been placed by no human hands. Their exquisite balance is the result of the weathering of the block and of the rock below, caused by wind and storm.

There are well-marked striated rock surfaces more than 1600 feet above the sea-level.

Various moraines described, as stretching across valleys like ramparts, and forming dams to existing lakes. (William Jolly in "Edin. Geol. Soc. Trans." i. 155.)

Kells.—On Craigenbay Farm, a grey whinstone boulder, about 10 feet high and 17 feet long, with girth of 54 feet; 800 feet above sea. Longer axis N. and S. (Reporter—Robert Wallace, Auchenbrack, Tynron.)

Kirkbean.—Grey Granite boulder, 16 × $9\frac{1}{2}$ × $7\frac{1}{2}$ feet, and girth about 38 feet, weighing about 80 tons. On sea shore at Arbigland. Longer axis, S.E. by E. Superficial groovings on top and S.W. front running N.N.W. Rests on freestone.

Criffel is about 3 miles to N.N.W. Granite rock there same as boulder. In all the glens, between sea shore and Criffel, numerous granite boulders generally in lines parallel with glens. Several kaims 40 to 50 feet high, run from $\frac{1}{4}$ to $\frac{1}{2}$ mile. (Reporter—Rev. James Fraser, Colvend Manse, by Dalbeattie).

Penninghame.—Granite boulders chiefly, supposed to have come from Minnigaff Hills, situated to N.E. Larger boulders on watersheds between Lochs Dee and Troul. (Reporters—Rev. William M'Lean, parish minister, and Rev. George Wilson, F.C. minister.)

Twynholm.—Granite boulder, supposed to have come from Galloway Hills, six or seven miles to westward. Several Druidical circles. (Reporter—Rev. John Milligan, Manse of Twynholm.)

LANARK.

Carluke.—Sandstone boulder, 20 × 14 × 14 feet, about 290 tons. Called "Samson's Sling Stone." Doubtful if an erratic. (Reporter—D. R. R.)

Carnwath.—Whinstone boulders in large heaps. Supposed to have come from "Yelpin Craigs," three or four miles to north. Legend about Michael Scott and witches. (Reporter—Rev. Mr M'Lean.)

NAIRN.

Auldearn.—A great many boulders in this parish, of old rocks, and lying chiefly on Old Red Sandstone rocks. Chiefly conglomerates, and apparently derived from same kind of rock, characterised by pebbles in it of angular quartz or hornstone, liver coloured. These boulders all lie on sides of hills facing N.W., and they have generally one of their sides smooth which fronts the west. (Reporter—James Rennie, schoolmaster.)

Ardclach.—At Raemore Burn, about 270 feet above sea, and 5 miles distant from sea, a conglomerate boulder with five sides, measuring altogether about 17 yards, and 3 yards above ground. Surrounded by hills of no great height; but lowest of these is to N.W. Fragments in conglomerate of quartz, hornstone, sienite, felspar, and other very hard rocks. The block is scarcely rounded at its edges and corners. (Reporter—Dr Gregor, Nairn.)

Cawdor.—On hill of Urquenay, the following boulders—1. At top of hill, about 690 feet above sea, conglomerate called "*Clach na Gillean*," or "*Young man's stone*," in girth about 54 feet; and height 10 feet. It rests on bare granite rock. 2. Half-way down hill, about 580 feet above sea, conglomerate called "*Clach na Cailleach*," or "*Old wife's stone*," in girth about 54 feet and height 15 feet. It seems to rest on drift gravel. 3. At foot of hill, and at east end of a kaim of gravel and sand, about 300 feet above sea, conglomerate called "*Clach an oglach*," or "*Boy's stone*," in girth about 69 feet, and average height about 9 feet.

Within policy woods of Cawdor Castle, on side of a burn

facing W.N.W., a conglomerate boulder about 250 feet above sea, in girth about 100 feet, and about 12 feet high.

The above four conglomerate boulders lie on granite rocks.

On Piper's Hill, where rocks *in situ* are Old Red Sandstone, a conglomerate boulder, on the side of a kaim facing N.W., weighing about 10 tons. Above sea about 300 feet.

No conglomerate rock of the same hard description in Nairnshire. On the granite rocks there lie boulders of sandstone, evidently transported from the north, where the Old Red Sandstone only exists, in the low country. (Reporters—W. Stables, Esq., commissioner; and his clerk, Mr John Grant, Cawdor Castle.)

Croy.—Conglomerate boulder, called "Tomreach," about 15 feet high, and girth of 27 yards. About 300 or 400 feet above sea. Sketch sent. (Reporter—Captain White, R.E.)

Orkney and Shetland.

Bressay (Shetland).—A number of boulders consisting of a coarse white sandstone at various heights, viz., from 40 to 360 feet above sea. They lie on east side of island, and are conjectured to have come from Norway. Largest boulder, 10 × 7 × 4 feet. Longer axis, N.W. Distinct groovings N.E. and S.W. (true); some of them 3 inches deep. (Reporter—Schoolmaster?)

Eday (Orkney).—Conglomerate boulder, 12 × 7 × 1½ feet, about 8 tons. Longer axis N.E. Situated near top of hill, about 250 feet above sea. Called "Giant Stone." Legend, as to it being thrown from island of Stronsay. No conglomerate in Eday, but there is in Stronsay. (Reporter—G. Miller, schoolmaster, Cross and Burness.)

Frith and Stennis (Orkney).—Pebbles of white freestone on the hills. No white freestone rock in district; all red sandstone. (Reporter—Robert Scarth.)

Housay Island (Shetland).—On a cliff, 200 feet above sea, there are loose blocks resting on rounded knolls and polished rock, all polished before the burthen they now bear was thrown upon them. Some of the stones hang on ridges on the rounded sides of the hill.

Lerwick (Shetland).—At Lunna, a large block, broken into two, called the "Stones of Stoffus," but uncertain whether erratics. (Reporters — James Irvine, teacher, and Robert Bell, proprietor.)

North Unst.—Here ice action plain. The serpentine rock has suffered severely. Ruts and striæ on it W.N.W. A hill 500 feet high, whole of upper part of which for 150 feet from top polished. Striated stones and blocks also plentiful. All over Unst the rocks show signs of abrasion, and in many places deposits of drift, inclosing stones of all sizes, some of which are rounded and striated.

In the *Island of Ueay*, large perched blocks, some many tons in weight, lie scattered about everywhere.

Thus then, at both ends, and in the middle of this group of islands, traces of glacial action have been found. (Peach, Brit. Assoc. Rep. 1864.)

Sanday (Orkney).—Gneiss boulder, $7 \times 2\frac{1}{2} \times 6$ feet, about 14 tons. Rocks of island are Old Red Sandstone. At Stromness, thirty miles to S.W., gneiss rocks occur *in situ*, also in Shetland Islands to north. Legend, that thrown from Shetland. (Reporter—G. Miller, schoolmaster, Cross and Burness.)

Sumburgh Head (Shetland).—Conglomerate boulder, lying over sandstone. (Reporter—William Lawrence, teacher.)

Walls (Orkney).—Lydian stone boulder, $9 \times 7 \times 6$ feet, about 28 tons. Large quantities of granite boulders scattered over hills; valleys show glacier and iceberg agency. (Reporter—James Russell, teacher.)

Peebles.

Kirkurd.—Three boulders of gneiss or trap (?) differing from adjacent rocks. (Reporter—James Palmey, schoolmaster, Kirkurd, Dolphinton.)

Newlands.—Remarkable kaims. (Reporter—E. Blacklock, schoolmaster.)

Perth.

Aberfeldy (Tullypowrie village). 1. On north side of village, a considerable assemblage of schist boulders, the rocks *in situ* being clay slate. Most of boulders round in shape as if rolled.

One large boulder angular, 16 × 14 × 7 feet, named "Clach Chinean," or "Stone of Doom." These boulders all rest on heaps of drift, much resembling a moraine. On the opposite or south side of the valley there are similar masses of drift, containing, however, stratified beds of sand and gravel.

2. About 2 miles north of Tullypowrie village, near the hills, two very large boulders of mica slate occur, about 1500 feet above sea. They rest apparently on a heap of drift. They are both cubical in form, and with sharp angles, as if never exposed to friction. One of them measured, and found to be 71 feet in girth and 17 feet high. The hills are more than $\frac{1}{4}$ mile distant. They must have been brought by ice of some kind, and let down without violence; for a fall from any height would have probably caused such large masses to break in pieces. The adjoining hills form a range to N. and W., reaching fully 700 feet above the boulders. But to N.W. (magn.) of the boulders, and within a $\frac{1}{4}$ mile a passage occurs through the hills, the level of which is only about 200 feet above the boulders. They might have come through this passage, carrying the boulders and stranding them where they now lie. These boulders, called "Clach M'had," or "Stones of the Fox."

3. Above Pitnacree House, a boulder of schist resembling hypersthene, 15 × $11\frac{1}{2}$ × 4 feet above ground. It is called "Clack odhar," or "Dun Stone." No hills are near it, and it differs from all rocks *in situ* near it. (Reporter—Mr M'Naughton, merchant, Tullypowrie).

Arngask.—Rocking stone of mica slate, in Glenfarg ("New Statistical Account," vol. x. p. 888).

Auchterarder.—Boulder, 10 × 6 × 2 feet, about 8 tons. Longer axis N.W. Called "Wallace's Putting Stone." (Reporter—Rev. Dr Nisbet, Edinburgh.)

Auchtergaven.—Granite boulder, 10 × 8 × 3 feet, about 8 tons; 260 feet above sea. Longer axis N. and S. Called the "Deil's Stone." Has numerous and distinct "cup" markings on its sides. Supposed to have come from mountains situated thirty miles to north. Has been mutilated by slices cut off it for building, &c. Several standing stones and Druidical circles in

this parish, composed of boulders. (Reporter—William Duff, schoolmaster.)

Bendochy.—Formerly a Druidical circle of nine large stones, now destroyed, but name still preserved of "Nine Stones." Long kaims of gravel or sand, which supposed may have caused river Tay to fall into sea at Montrose. (Reporter—Rev. Dr Barty.)

Callendar (Stirling).—Gneiss boulder on top of Bochastle Hill, called "Samson's Putting Stone," 14 × 9 × 9 ft., resting on conglomerate rock. Longer axis N.E. Sketch sent, showing unstable position. Has come from westward. (Reporter—J. B. Hamilton, Leny.)

Collace.—Large stones said to be here. Query,—are they erratics? (Reporter—Peter Norae, schoolhouse, Collace.)

Comrie.—Four boulders of whinstone, and one of granite, 13 × 9 × 7½ feet, weighing about 20 tons. Longer axis N. and S. (Reporter—Wm. F. Swan.)

Crieff.—1. Conglomerate boulder, 16 × 10 × 5½ feet, about 64 tons, "Witches' Stone." 2. Conglomerate boulder, 19 × 10 × 5 feet, about 70 tons. 3. Red granite boulder, 8½ × 4½ × 4 feet, called "Cradle Stone." (Reporter—Rev. Dr Nisbet, Edinburgh.)

At Abercairney, dark grey granite boulder, about 20 tons. (Reporter—C. Home Drummond Moray; and Rev. Thomas Hardy, parish minister.)

In Glen Turret, appearances of ancient moraines, described in letter by Mr Sang, C.E., Kirkcaldy.

Doune (near Kilbride).—Conglomerate boulder, about 900 tons. (Described in Estuary of Forth, by Mr Milne Home.)

Dron.—Whinstone rocking stone, 10 × 7 feet. Stands on bare rock ("New Statistical Account," vol. x. 364).

Errol.—Several boulders, differing from adjacent rocks. Said to be indicated on Ordnance Survey maps.

Fortingall.—Gneiss boulder, 24 × 16 × 13 feet, called "Clach an Salaine," from people who brought trees out of Black Wood of Rannoch, resting them on it. Height above sea 2500 feet. Rocks *in situ* clay slate. Longer axis N.W. (Reporter—Mr Fletcher Menzies.)

Fowlis.—Two dark grey granite boulders, 10 × 7 × 4 feet, and 12 × 6 × 4 feet. Supposed to have been used as places of worship or sepulture, in very ancient times. (Reporter—Rev. Thomas Hardy.)

Killiecrankie (Tennandry Parish).—Blue limestone boulder, 6 × 5½ × 4 feet. Supposed to have come from "*Ben y Gloe*," a hill to N.N.E., across valley 500 feet deep; plan of district sent. Granite boulder, also mentioned; has come from North. (Reporter—Rev. Patrick Grant, Tennandry Manse.)

Kilspindie.—Seven granite boulders, from 5 to 6 tons weight. Five form a belt or row having N.W. direction. All differ from adjacent rocks. (Reporter—James M'Kerracher, schoolmaster, by Errol.)

Kirkmichael.—Rocking stone, 7 × 5 × 2½ feet, about 3 tons, whinstone. (?) Several tall stones near it, called "Clachan Sleuchdaidh" (Stones of Worship).—("New Statistical Account," vol. x. p. 737.)

Logie Almond.—Whinstone boulder, 8 or 10 feet square, about 48 tons, called "The Ker Stone," about 600 feet above sea, on north bank of River Almond, opposite to Glenalmond College. Probably, as there is a great peat moss near, the name has reference to the moss, "char" being the Gaelic for peat.

There is another boulder called "Cul na Cloich," or *Stone Nook.* A stream forms a nook or angle with the drain or ridge on which the boulder stands. It is a conglomerate, and rests on Old Red Sandstone. Another conglomerate boulder occurs at S.E. corner of the farm of Risk. (Reporter—Rev. Patrick Macgregor, Logie Almond Manse.)

Methven (Auchtergavin Parish).—Whinstone boulder, about 10 feet high, oval shaped, standing on small end, called "Sack Stone." No rock of same kind near. 800 feet above sea. (Reporter—William Duff, schoolmaster.)

Monzie.—In Glen Almond, a large stone, 8 feet high, near side of river, nearly cubical, called *Clach-Ossian*, said to mark grave of that poet. ("New St. Acct." of parish, vol. x. 264.)

Pitlochrie.—1. On road to Straloch, mica slate boulder, called "*Gledstone*," about 1800 feet above sea. Lying on drift of gravel and stratified sand. Rocks adjoining clay slate.

About 8 tons weight. Legend, that this stone gave name to Gladstone family, an infant having been found at it by a shepherd, who took it home to his wife, who nursed it.

2. Near parish church of Straloch, a huge boulder of very coarse granite, called "*Clach m'hor*," or "*Big stone*," about 24 feet diameter, and about 20 feet high. Supposed to weigh about 800 tons. Adjoining rocks clay slate. Many other boulders of mica slate and quartzite beside it. Supposed to have come from north through a valley. (Reporter—Rev. Dr Robertson, Straloch.)

Rattray.—Mica schist boulder, 12 × 6 × 6 feet, about 25 tons, called "Glenballoch Stone." Has cup and groove markings on south side. There are other boulders in Druidical circles. They have all come from hills to N. or N.W. (Reporter—Rev. Mr Herdman, Rattray.)

Renfrew.

Kilbarchan.—Porphyry boulder, 22 × 17 × 12 feet, about 300 tons. Longer axis E. and W., called "Clach a Druidh" (Stone of Druid)? Legend. Boulder differs from adjacent rocks. Same rock seen in hills 2 or 3 miles to west and north. (Reporters, —Robert Graham, D.D.; and R. L. Jack (Geol. Survey).)

Ross and Cromarty.

Alness.—In forest of Gildermoy, a very large granite boulder reported by Earl of Selkirk.

Applecross.—Three large boulders, one near shore at Rassel, called "*Clach Oiu*," weighing about 60 tons, other two about 30 tons, each called respectively "*Clach Mhoir*" and "*Clach Van*." Used as landmarks from the sea. Kaims at Ardbain and Ardrishach, extending each more than two miles along coast. (Reporter—William Ross, schoolhouse, Applecross.)

Ben Wyvis.—N.W. shoulder of, presents whole acres of rock, swept bare of soil, rounded and polished. Boulders of a peculiar veined granite have come from the Derry More (tract situated to west of Ben Wyvis), and been carried eastward to Moray Frith. These boulders found half-way up Ben Wyvis, also in valleys of Alness and Ault Grand. In Strathgarve some of

the blocks are as big as cottages. Their size lessens towards E. No boulder of same kind seen on West Coast. (Nicol "Geol. of N. of Scot.," p. 70.)

Carnock.—Five large boulders, each weighing about 20 tons. Each has a Gaelic name. One, a boundary stone. (Reporter—James Watson, schoolhouse, Strathconon, Beauly.)

Edderton.—Granite boulder, 23 × 19 × 12 feet, weighs about 290 tons. Longer axis N.E. Two others, not quite so large. All differing from adjacent rocks. (Reporter—Rev. Ewen M'Ewen, parish minister.)

Rev. Mr Joass states that this word is derived from "*Garbh*"—"*rough*," the Gaelic for "*Hill of the Pitcher*," on account of shape, its sides being almost vertical. (Rev. Mr Joass.)

Rev. Mr Joass of Golspie states, that the boulders here referred to are on a shelf or terrace about 900 feet above sea, and that their parent rock is at Carn na Cuinnaig about 12 miles to N.W.

He adds, that the boulders specified, as in the parishes of Tain and Tarbat, are probably from same source. The granite is peculiar. (See Tain and Tarbat farther on.)

Fannich Mountains.—Boulder of grey gneiss, with garnets. 30 × 10 × 5 feet, described in letter to Convener by J. F. Campbell of Islay; 2700 feet above sea; angular. Situated on watershed. Called "Clach mhor na Biachdoil." A train of large boulders to be seen in a valley not far off. Rocks also smoothed and striated. Lines of striation parallel with valleys.

Foddarty.—Boulder, 14 × 8 × 5 feet, about 40 tons. About 6 feet above sea; shape, angular; Druidical. Another with inscription illegible. Supposed to commemorate a battle between two clans. (Reporter, parish schoolmaster.)

Lochalsh.—Gneiss boulder, 9 × 7 × 8 feet; longer axis E. and W., striated. Boulder differs from adjacent rocks. Same rock said to be at Glenelg, 5 or 6 miles to south.

Boulder called after Fingal. Quartz, $7\frac{1}{2} \times 7 \times 5$ feet. Longer axis, N.W.; striated. At Loch Carron, said to be a kaim or diluvial bank. (Reporter—Duncan Sinclair, parish school, Lochalsh.)

Lochgair.—One granite boulder, 28 × 17 × 16 feet, about 560 tons; striated. Two granite boulders. 23 × 10½ × 7 feet, about 120 tons. One of these said to be on top of a hill, and called "Sandel Stone." Legend. There are three other boulders of smaller size. Rocks *in situ* are granite. (Reporter—John MacKillop, schoolmaster.)

Shieldag (Loch Carron).—Granite boulder, 16 × 10 × 10 feet, about 120 tons. Longer axis E. and W. There is another large boulder. Both said to be in precarious positions. (Reporter—Rev. Alex. C. M'Intyre, Shieldag Manse, Dingwall.)

Tain.—Granite boulder, 18 × 12 × 8½ feet, about 60 tons. Plan and section of boulder given. Rocks of district are Old Red Sandstone. South shore of Dornoch Frith said to be thickly strewed with granite blocks, whilst none on north shore. (Reporter—Robert Gordon.)

Tarbat.—Seven or eight large boulders of gneiss and granite. Places, dimensions, and names specified, with sketches of boulders. Also, kaims of clay running E. and W. in parallel lines. One a mile long. (Reporter—Rev. George Campbell, parish minister.)

West Coast.—Vestiges of moraines, lateral and terminal, from glacier generated in valley occupied by Loch Fuir, N. of Loch Maree. (Nicol "Geol. Soc. Jour.," xiv. p. 170.)

ROXBURGH.

Eckford.—Two kaims, each from 100 to 300 yards long, from 50 to 60 feet high. (Reporter—Parish schoolmaster.)

Jedburgh.—Porphyry boulder, supposed to have come from Dunion Hill, which is 2 miles to west. Formerly granite boulder on Dunion. Supposed to have come from Galloway or Dumfries; now destroyed. A whinstone boulder, above Bedrule Bridge. (Reporters—Rev. Archibald Craig and Rev. Dr Ritchie.)

Melrose.—Greywacke boulder, round shaped, called "Samson's Putting Stone." (Reporter—Parish schoolmaster.)

STIRLING.

Alloa.—Basaltic boulder, 13 × 11½ × 11 feet. Longer axis N. and S. Called "Hair Stane." About 70 feet above sea. (Reporter—Parish minister.)

Campsie.—Rocks glaciated. Striations W.S.W. & W.N.W. (Reporter—Rev. Thomas Monro, D.D.)

Fintray.—Boulders in a group, called "Gowk Stones." Have apparently come down valley. (Reporter—R. L. Jack (Geol. Survey).)

Kilsyth.—Mica Slate boulder, $7 \times 5 \times 2\frac{1}{2}$ feet, about 6 tons. 1250 feet above sea. Parent rock supposed to be 15 miles to north. (Reporter—R. L. Jack (Geol. Survey).)

Ochils.—On watersheds of, at about 2000 feet, boulder of mica schist fall of garnets, apparently from Grampians to N.W. (Jamieson, "Geol. Soc. Jour.," xxii. p. 166.)

St Ninians.—Boulder about 200 tons, at height of 1250 feet above sea. (Reporter—R. L. Jack (Geol. Survey).)

Strathblane.—Conglomerate boulder, $8 \times 4 \times 3$ feet, about 7 tons. Longer axis W. 20° N. 1803 feet above sea. Parent rock supposed to be to N.W. (Reporter—R. L. Jack (Geol. Survey).)

SUTHERLAND.

Assynt.—Two arge boulders, one at Unapool, the other at Stronchrubie, called "Clach na Putain" (Stone of the Button). (Reporter—Angus M'Ewen, parochial schoolmaster.)

Clyne.—Remarkable kaims, apparently moraines (lateral and terminal) in valley of Brora. Also, rocks striated at Brora quarry. Striæ run N.W. (Reporter—M. Myron.)

Golspie.—Old Red Sandstone boulder, $16 \times 10 \times 4$ feet, lying on Oolite rocks. Longer axis, N.N.W.; sub-angular. Sketch sent. About 248 feet above sea. Three smaller boulders of Old Red Sandstone lie about 100 yards to S.E. of the above. The Old Red Sandstone formation is situated to north and west, about 3 miles from boulder. Terminal and lateral moraines occur in Brora valley, broken up by diluvial action into ridges and hummocks. (Reporter—Rev. James Joass, minister of Golspie.)

On the whole N.W. coast from Cape Wrath southwards, numerous "Perched" boulders occur on summits and sides of hills, in the most exposed positions. Especially numerous around Loch Maree. (Nicol "Geol. Soc. Journal," xiii. pp. 29, 39.)

Boulders of large size on top of Applecross Hills. Rocks below, striated. Direction of striæ S. 20° W. (true.) (Reporter—Nicol of Aberdeen.)

Wigtownshire.

Glasserton.—Granite boulder, 9 × 6 × 6 feet, about 24 tons. Longer axis N.E. Two small boulders to east of above, and in a line with it. These boulders supposed to have come from mountains to N.E., across arm of sea. Kaims in parish, full of granite pebbles. (Reporter—Archibald Stewart.)