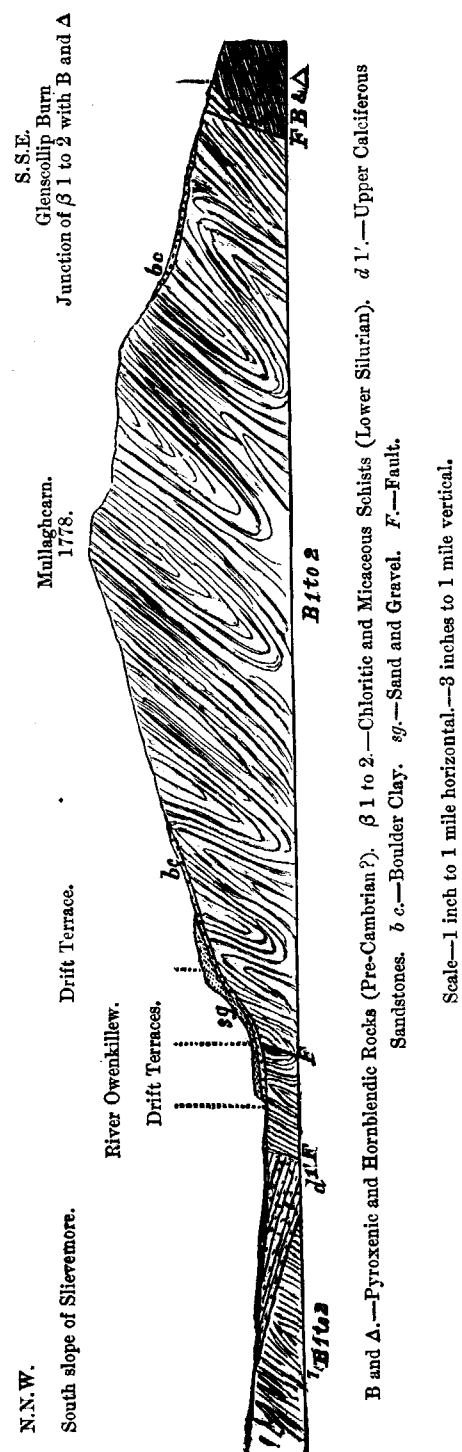


FIG. 1.—SECTION ACROSS MULLAGHCARN MOUNTAIN.



26.

Memoirs of the Geological Survey.

EXPLANATORY MEMOIR.

TO ACCOMPANY

SHEET 26 OF THE MAPS

OF THE

GEOLOGICAL SURVEY OF IRELAND,

COMPRISING PORTIONS OF THE

COUNTIES TYRONE AND LONDONDERRY.

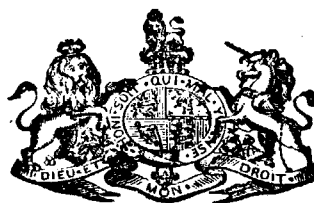
BY

JOSEPH NOLAN, M.R.I.A.

WITH

PALÆONTOLOGICAL NOTES BY WILLIAM H. BAILY, F.G.S.

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The observations made in the course of the Geological Survey, are entered, in the first instance, on the Maps of the Ordnance Townland Survey, which are on the scale of six inches to the mile. By means of marks, writing, and colours, the nature, extent, direction, and geological formation of all portions of rock visible at the surface are laid down on these maps, which are preserved as data maps and geological records in the office in Dublin.

The results of the Survey are published by means of coloured copies of the one-inch map of the Ordnance Survey, accompanied by printed explanations.

Longitudinal sections, on the scale of six inches to the mile, and vertical sections of coal-pits, &c., on the scale of forty feet to the inch, are also published, and in preparation.

Condensed memoirs on particular districts will also eventually appear.

The heights mentioned in these explanations are all taken from the Ordnance Maps.

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PREFACE.

THE District embraced by this Memoir was geologically surveyed by the Author, Mr. Nolan, who has ably described its physical features and geological structure. The larger portion consists of two sets of metamorphic beds, one probably of Lower Silurian age, the other of Pre-Cambrian or Upper Laurentian. The fossiliferous Palæozoic beds are found in the neighbourhood of Draperstown and Cookstown.

EDWARD HULL,
Director.

28th July, 1884.

EXPLANATORY MEMOIR TO ACCOMPANY SHEET 26 OF THE MAPS OF THE GEOLOGICAL SURVEY OF IRELAND.

INTRODUCTION.

THE district included within the limits of this sheet of the Geological Map of Ireland lies chiefly in county Tyrone, comprising most of the wild hilly country lying between Omagh and Cookstown, with a small part of county Londonderry to the north-east. The only town in the entire district is Draperstown, in the latter county; while in Tyrone, Gortin lies close to the western margin, Cookstown one mile to the south-east, and Pomeroy and Omagh about four miles respectively to the south and south-west.

Most of this area has been described and mapped by the late General Portlock, F.R.S., in his "Geological Report on Londonderry and parts of Tyrone and Fermanagh" (1843).

CHAPTER I.

PHYSICAL GEOGRAPHY AND GEOLOGY.

The greater part of this district is of an elevated and mountainous character. To the north and north-west are the Sperrin mountains, dividing the bleak country about to be described from the more fertile, well wooded, and thickly populated area to the north, the chief summits being Mullaghclogha 2,088 feet, Mullaghasturrakeen 1,904 feet, Mullaghclogher 1,896 feet, and Mullaghearbatagh 1,712 feet, while Sawel, the culminating point of the range, lies about a mile outside the northern margin. South of these mountains, and parallel to them, is the lesser chain called the Munterlony hills, reaching an altitude of 1,456 feet, parallel to which again on the south is another range that at its eastern end near Draperstown attains some considerable heights, of which Spaltindoagh, 1,388 feet, and Carnanelly, 1,851 feet, are the most important. North of these, and separated by the valley through which the road from Strabane to Draperstown is carried, is Mullaghsallagh, 1,596 feet, a spur from the Sperrin range, and the outlying hills of Crockmore and Crockbrack, 1,735 feet.

In the south-western portion of this district is the mountain Mullaghearn, which, though not rising higher than 1,778 feet, is very remarkable from its extent and prominence in the landscape around Omagh. Towards the south-east near Cookstown is a group of hills of which Oughtmore 1,261 feet, Belevnamore 1,257 feet,* and Fir mountain 1,193 feet, are the chief; while on the eastern margin is Slieve Gallion†, a considerable portion of which lies within these limits, though the greater part, including the summit, lies in the adjoining area (sheet 27), and is described in its accompanying memoir.

As may be seen by the map, the trend of these mountains is in general to the E.N.E. and W.S.W. coinciding with the prevailing strike of the rocks, and thus determining the direction of the principal valleys and river systems. Of the gaps or passes that break their continuity, the most remarkable is Barnes' gap, west of Mullaghbolic—highest of the Munterlony hills—which has some resemblance to Bernisk glen near Carrickmore, figured and described in the memoir to accompany sheet 34, and like it, cuts directly across the strike of the rocks.

Most of this mountain region, including the Sperrin and Munterlony ranges and Mullaghearn, is composed of micaceous and chlorite schists, probably of Lower Silurian age, and presents the smooth flowing outlines usually characteristic of mountains of that formation; to the east, about Lough Fea, and south and south-westwards from that lake, much of the country is composed of pyroxenic rocks, which there is good reason to believe are of pre-Cambrian age, and has a stern rugged character, in some parts it is a boggy tableland interspersed with hummocks and crags, in the midst of which the gneiss and schists of the same formation, harder and more silicious than that to the north, rise into a group of hills of considerable elevation. The portion of the pyroxenic rock area south-east of these latter is less boggy and barren than that on the north-west, yet it is very rocky in some places, as at Oritor, where rough crags of hypersthene rock rise almost abruptly from beneath the undulating Carboniferous Sandstone ground, which occupies the rest of this area towards Cookstown. This latter formation also occupies most of the north-eastern part of the district about Draperstown, characterized by the same soft and cultivated features, and a small area to the west near Gortin.

The watershed of this district enters on the north at the county boundary, passes through the small bog at Lough Ouske, and from thence south-westwards along the ridge of hills to Laghta, whence it turns south, and enters the great bog that stretches to the south and south-west. On the west of this division the chief rivers are, the Owenkillew with its main tributary the Owenreagh, which joins it at Drumlea, and from thence flows past Gortin, where it leaves the district, and the Glenelly which

* This is pronounced as if written "Belev'any." In like manner Formnamore, the name of a mountain in Mayo, is pronounced Fur'ramy.

† Slieve-Gallion—Sliab-Gal-an. The mountain with the obelisk for recording the stars. See Sampson's Statistical Survey of the County Londonderry.

deriving its head waters from the high moorland country near Lough Ouske, traverses the valley south of the Sperrin mountains, and after leaving these limits, joins the Owenkillew three miles east of Newtownstewart, where it enters the chief river in this part of the country, which, under the various names of Strule, Mourne, and Foyle, finds its way to the sea at Londonderry.

On the east of the watershed is the Ballinderry river which flows past Cookstown, a little outside the south-eastern margin of our area, and from thence continues eastward to Lough Neagh, and the Moyola, which, having its sources in the hilly country south-west of Draperstown, finally discharges its waters into the same lake.

Notwithstanding the mountainous character of the district there are very few lakes, the only one of any importance being Lough Fea, six miles S.S.W. from Draperstown. The others are mere tarns, and are confined to the extreme south and south-west, none whatever being found among the mountains to the north and north-west.

CHAPTER II.

Formations or Groups of Rocks entering into the Structure of the District.

SUPERFICIAL DEPOSITS.

	Colour on Map.
Alluvium and Peat Bog,	Burnt Sienna.
Drift—Sand and Gravel and Boulder Clay,	Engraved dots.

AQUEOUS ROCKS.

Lower Carboniferous Beds.	d' Upper Calciferous Sandstones,	Prussian blue with wash of Indian ink and yellow dots.
	d' Lower " "	Do., with lighter wash.

IGNEOUS AND METAMORPHIC ROCKS.

B.—Basalt, Dolerite, &c.,	Burnt Carmine (deep tint).
β 1 to 2.—Schist and Gneiss— (Lower Silurian metamorphosed),	Light Crimson Lake.
Δ & B.—Hornblende and Pyroxenic metamorphic Rocks,	Burnt Carmine (light tint).
Hy.—Hypersthene Rocks,	Do., dotted with white.
E.—Quartziferous Porphyry (Elvanite),	Deep Carmine.
S.—Syenite,	Orange Chrome and Carmine.
G.—Granite,	Carmine.

IGNEOUS AND METAMORPHIC ROCKS (probably of Pre-Cambrian age).

Granite.—This rock occurs on the flanks of Slieve Gallion close to the eastern margin of the district, being part of a larger mass occupying a considerable tract of that mountain in the adjoining area. It is usually of a light pink to flesh colour, very quartzose, and appears to contain at least two felspars, the one, white to light pink, orthoclase—the other, seagreen, probably oligoclase, with a peculiar soft green mineral that Portlock calls chloritic mica, but which is more probably margarodite. In some parts a little hornblende was observed, but it is not a constituent.

To the south, this rock is met with near Dunmore, where it seems to graduate from the schists, and appears in numerous places on the hill to the right of the road, but perhaps the best section is that exposed in the stream that enters the map close to the parallel of $54^{\circ} 43'$, which for nearly half a mile of its course runs through this rock. Here the granite presents considerable variety, for while the soft green mica enters largely into its composition in some places, in others it almost disappears, and towards the north-east the rock passes into elvanite, the quartz appearing as crystals in a felspathic base. To the south-east, where a road crosses the stream, there is a change of a very different character. There quartz diminishes while hornblende increases, and there is an equally gradual passage into a rock perfectly similar to the hornblendic metamorphic type, which will be afterwards described. In a branch stream to the N.N.W. granite is also freely exposed, and close to the place where the stream is crossed by a by-road leading northwards, there is syenite. Here the relations between these rocks are not seen, but at a little distance farther north there is syenite passing into syenitic-granite, and a little to the east is a boss of rock where the latter passes into typical micaceous granite.

A little granite is also seen in the Kildress or Ballinderry river, near Oaklands, about three hundred and fifty yards north-west of the bridge. It is similar to that just described, and seems to pass into the coarse pyroxenic rocks adjoining; however in one place, where it has more the character of syenite, it appears to penetrate the latter for a few yards. Beyond this, a little higher up the river, more granite was noticed, but its extent is far too limited for notice on the map.

Syenite.—This rock has already been referred to in connection with the granite of Slieve Gallion, which it adjoins on the south-west. Like that rock too, there is considerable variety in its composition. In some parts there is a large quantity of hornblende, while in others this mineral is sparingly disseminated. These varieties are well shown in and about the little stream south of Ballybriest bridge, where in one part is a coarsely crystalline quartzose mass with hornblende, changing to a rock in which there is but little of that mineral, quartz being also in small quantity, and this again giving place to a variety that contains these minerals

in sufficient proportion to constitute a typical syenite. Close to the county bridge is a rock having a very granitic aspect and containing some of the soft green sectile mineral observed in the granite. It is apparently an intermediate variety.

Syenite also occurs at Deevog bridge, two miles north-west of this locality. It contains hornblende, pink felspar, and quartz, but in some parts there is a foliated structure approximating it to a syenitic gneiss. A boss of similar rock is found on the roadside at Blackrock, four miles to the south-west.

Quartz Porphyry or Elvanite.—This rock also occupies a large tract on Slieve Gallion, being, like the granite, a portion of a larger mass to the east, in the country included in sheet 27. Its composition and appearance often closely resemble the granite, transitions into which, as before remarked, may be observed in many places, the chief difference being the mode of occurrence of the quartz, which, forming the base or skeleton in granite, appears in the porphyry as distinct well-formed crystals. While on one hand, quartz porphyry thus passes into granite, there are also many places where transitions into the green pyroxenic and hornblendic rocks were noticed. A tract of this latter, as may be seen by the map, occupies an adjoining position on the mountain, being nearly surrounded by the quartz porphyry, and sections exhibiting the relations of these rocks to each other may be observed. In the stream north-north-east of Crockandun loughs, at a distance of about three quarters of a mile, the hornblende rock is succeeded by quartz porphyry with distinct slaty structure, in part resembling the green compact variety, and in a stream about the same distance to the east, just outside the limits of the map, still clearer evidence of these changes may be found, the compact green variety passing into coarsely crystalline hornblende rock. Here, and at another place to the south-west, near Black Lough, hæmatite appears coating joints.

A smaller, though highly interesting tract of quartz porphyry occurs at a place also called Crockandun, on the road from Cookstown to Gortin, about eight miles S.W. from the district just described. Here there is considerable variety—to the west the porphyry is of the normal type, while to the south, close to the borders of the hornblendic rock, much of the mica disappears, and the base is greenish and compact, so that it is in many cases difficult to say to which class the rock should be referred, and towards the north are greenish blue felspathic rocks with scattered prisms of hornblende and occasional crystals of quartz. Some of these varieties might be called felstones.

South and south-west from this, quartz porphyry was noticed in several places among the hornblendic rocks, as may be seen on the map. At Barony bridge, near Creggan House, it is a pink-coloured rock with mica changing to a felspathic green variety, that passes at length into hornblendic rock with iron pyrites, and a very quartzose porphyry was found a little higher up the stream.

W.S.W. from Creggan, on the main road between Cookstown

and Omagh, slight transitions from the compact green rock that makes up the district into the porphyry may be noticed, and farther west, at Copney, a mass of it occurs at the hamlet of that name, and also on the top of the hill, where it is so mixed up with the dark green hornblende rock that it is impossible to regard them but as varieties of the same mass. Similar phenomena were noted west of this, at Loughmacrory hill, and the vicinity of Lough Fingrean. In the continuation of the metamorphic rock area to the south, there are several transitions of the same kind, which have been already described in the memoir accompanying sheet 34. Some quartz porphyry also occurs among the schists north and north-west of the hornblende series, and will be described in connection with them.

Hornblende and Pyroxenic Metamorphic Rocks.—These, as will be seen by the map, occupy a considerable portion of the district to the east, south-east, and south, with an included tract of gneiss and schists which will be afterwards described. The rock varies considerably, being in some places a green compact structureless mass, changing to a finely crystalline aggregate of hornblende or pyroxene, or both, with felspar; in others, a coarse variety in which hypersthene is often largely developed, (hypersthene). Again, it is not uncommon to find quartz in some parts associated with the hornblende, and increasing in quantity, converting the rock into syenite.*

On Slieve Gallion, as before remarked, there is a mass of this metamorphic hornblende and pyroxenic rock almost surrounded by the quartz porphyry. Its prevailing character is a compact green serpentinous mass that in some places shows slight schistose structure, and a very instructive section illustrative of the many varieties it assumes, is seen in the stream forming the townland mearing south-east from Crockandun lough. There, at a little distance from the road, is a hard slaty green rock, a little higher up it is distinctly pyroxenic, and approaches the character of diallage. This again gives place to the hard slaty variety, with the addition of quartz, and higher up are alternations of compact or microcrystalline green rocks with others that look like indurated slate of a light purplish colour. In the stream to the east, just outside the limits of the map, there are, as before mentioned, clear evidences of the passage of this rock into quartz porphyry and syenite.

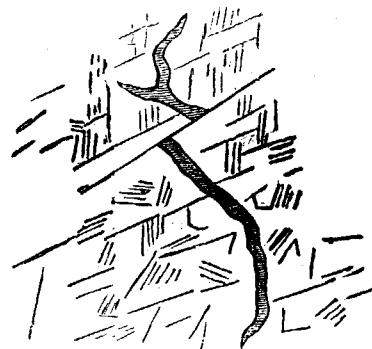
In the tract of this rock on the S.W. part of the mountain, little was observed owing to the thickness of the drift, but prominent bosses crop out close to the syenite and granite, and a well-marked change to the latter, where the road crosses a stream half a mile east of Ballybriest bridge, has already been described. Westward from Lough Fea the country is mostly covered with bog and gravelly drift, but hornblende rocks slightly schistose were noticed on Fir mountain, south-west of the lake, and about

* For the sake of uniformity in the Survey Explanations, the definition of Syenite given in Jukes' Student's Manual of Geology is here followed, viz.—“A crystalline granular aggregate of felspar, hornblende, and quartz.”

Deeveg bridge, close to the syenite. West of this is a wild uninhabited district where much rock of a similar kind crops out. Here, at Crocknacreeha, hypersthene prevails, and is often found as large crystals; and at three quarters of a mile north of that hill there is a green microcrystalline rock which in some parts abounds with micaceous iron, while in others it is a purple-coloured jasper. This locality will be again referred to in the chapter on mines and minerals. At Bonnety Bush, in the immediate vicinity, a beautiful crystalline variety with white and flesh-coloured felspar occurs.

In the south part of this wild district the hills of Craiganullar, Craigateora, and Craiggrena are composed of similar rocks. At the first-named locality quartz is disseminated, and there is an approach to syenite; at Craigateora, the rocks appear to contain both hornblende and pyroxene, varying from compact to coarsely crystalline, hypersthene particularly being largely developed, and the rock is often traversed by dyke-like veins of finer texture. These latter appear to be analogous to the veins called euries by the late Professor Jukes, which traverse the coarser granite at Killiney, county Dublin, and like them are probably due to cracks in the partly consolidated rock becoming filled up with molten portions of the same mineral mass.

Fig. 2.



Dyke-like mass of finely crystalline rock traversing a coarsely crystalline Hypersthene.

Similar rocks appear at Craiggrena, where there seems to be a prevalence of the pyroxenic minerals, and crystals of hypersthene two inches long were observed, while it is worthy of remark that even in the same boss portions are quite compact, so that it is impossible to draw any division between these varieties; nor indeed does such exist, the crystalline portions occurring in many instances promiscuously through the compact varieties, and hand specimens exhibiting these alternations may be procured. This is particularly well shown here, and there are also cases where the same rock mass is in part a coarsely crystalline hypersthene, while other portions contain quartz with orthoclase, and there is a considerable approach to quartz porphyry.

The low rocky hill of Blackrock, south-west from this on the farther side of the county road, also shows wonderful variety in these rocks, but they are here more fissile, and in some parts porcelainic, resembling baked slates, as has been remarked also at Carrickmore in the district to the south (sheet 34). As in that locality too, some portions are largely crystalline. Close to the road is syenite containing black mica.

On the road-side, half a mile south-west of this, similar semi-foliated and crystalline rocks with hypersthene were also observed, and farther on, near the boundary of the chloritic schists, there is diallage. Some of the latter too looks foliated, and it changes into a hard porcelainic rock full of ramifying veins of quartz. Hereabouts, as before mentioned, there is quartz porphyry. Farther south-west, in the vicinity of Creggan, there are several exposures of these metamorphic rocks. At the stream south of Creggan House, and at about a mile farther west, there are transitions into the porphyry, and Mweela More, the remarkable hummock in the midst of the large bog on the north side of the road, is composed of a very compact rock that is cellular in parts, the original cavities being filled with carbonates, while other portions are felspathic. The same phenomena were observed on a larger scale at Copney hill, particularly in its eastern side, near Creggan lough. Here the green cellular rock, although having a considerable resemblance to one of volcanic origin, is clearly seen to graduate into the compact and crystalline varieties before described. Here too, in the vicinity of the R.C. chapel is a peculiar breccia. The pieces and semi-rounded pebbles are chiefly of hard green felspathic rock, with quartz blebs, highly altered slate, &c. There can be no doubt of its being a metamorphosed fragmentary rock. Breccias somewhat resembling this were noticed at Broughderg in the chloritic schist series.

On the summit of Copney hill the green varieties contain much serpentine, and in some parts might almost be considered as basic felstones. Like the others they are intimately associated with and pass into the porphyries, the larger masses of which are shown on the map.

At Mountfield—five miles farther west, close to the Lodge, and in the stream that flows from Lough-a-Tirrive (*Lake of the bull*), are finely crystalline hornblende rocks with iron pyrites, and others more compact and in parts felspathic, with quartz veins, are seen in a stream to the south-west, a little east of Craig hill. This is the only section showing the relations of the hornblendic and pyroxenic series to the chloritic schists which here rest upon it.

The other tract of these rocks, in the south-eastern portion of the map, is similar to that just described and exhibits the same sudden transitions. In the neighbourhood of Clare church, and along the Ballinderry river there is chiefly diallage or hypersthene, some of which too has a fissile structure, as before remarked, near Blackrock. At the Salmon Leap, a pretty little cascade north of Oaklands, the rock contains much serpentine, and is succeeded by the peculiar granite before described.

The hill of Craigs, near Orior, is mainly composed of hyper-

sthene. In some places it is perhaps more crystalline than in any other part of the district. It also contains an abundance of serpentine and epidote, pieces of which latter mineral, of a pale yellowish green colour, often weather out, forming a peculiar characteristic. Portlock states, that steatite of "light cobalt blue colour" is also found here. Although the prevailing felspar appears to be labradorite, as in the district to the south, yet orthoclase frequently occurs, and the rock is in some part traversed by veins composed of this felspar and quartz. As remarked of other localities, dyke-like veins of finer material traverse the more crystalline portions.

Gneiss and Schist, probably of pre-Cambrian age.

Under this heading is described the large lenticular-shaped tract of rocks lying within the area of those just described, in contradistinction to the metamorphic rocks of the north and north-west, which may be termed the Chloritic Schist series. The length of this area is about twelve miles, terminating in a narrow tongue towards the south-west, just within the limits of the adjoining map, and to the north-east, disappearing under the Triassic series, south of Slieve Gallion, in the district included in sheet 27, with a width of four miles in its widest part, and including Fir mountain, Beleevnamore and the adjoining hills. The rock is a mica schist passing in many places into gneiss. This latter form is more prevalent in the portion to the south-west, particularly at Evishanoran mountain, where much black mica and hornblende are associated. For the rest of the area it is chiefly a schist, often very quartzose, usually containing black mica, and hornblende in small proportion. At Beltonanean mountain there is also a bright silvery-looking mica that is probably lepidolite.

It is remarkable that close to the hornblendic rock area the foliation of the schists is indistinct and sometimes hardly perceptible, so that it is often a matter of much difficulty to draw any line of separation. From this circumstance and others, some of which have been already mentioned in the preceding description of the hornblendic and associated rocks, it would appear that they all form part of one system, the differences in composition of the original rocks producing corresponding chemical changes which resulted in the development of micaceous and quartzose schist in some places, and hornblendic pyroxenic and granitic rocks in others.

The passage of the schists into these latter may be frequently observed. Thus at Lissan, in the stream forming the county boundary, there are transitions from a bluish green gneissose schist, with lepidolite(?), into a crystalline rock of hornblendic type but distinctly foliated, and this, as before remarked, passes into a granitoid rock scarcely distinguishable from the adjoining granite. At Fir mountain we have typical micaceous schists and gneiss succeeded by a coarse variety with obscure foliation and containing hornblende, till north of the summit we meet with rocks that it is almost impossible to relegate with certainty to either class.

CHLORITE SCHIST SERIES (probably of Lower Silurian age).

This formation, as may be seen by the map, occupies by far the greatest portion of the area, including the mountain ranges of Sperrin, Munterlony and Mullaghcar. Its prevailing character is a green chloritic-looking schist, in some places dull and earthy, in others shining. Talc, too, seems to be a frequent constituent, with hydrous mica, which latter often imparts a peculiar sheen to exposed surfaces of the rock. Limestone beds are uncommon, two only being observed, though they are numerous in that part of the formation to the north, within the limits of sheet 18.

Commencing our examination on the north-west, we find the mountains there thickly covered with drift up to a considerable height, but schists are occasionally met with in the streams traversing the long valleys that indent these mountains on the south, as well as on the ridge and summits, and are in some places highly quartzose, as at Mullaghcarbatagh, where they form marked crags that give a very distinctive character to this elevation. To the west at Mullaghasturakeen, a dyke or bed of dolerite occurs, which will be afterwards more particularly described.

The country eastward from this to the Carboniferous area contains little worthy of special mention, the rocks being perfectly similar to those just described. In the quartzose portions, the quartz has often the appearance of pebbles elongated in the direction of the foliation. Here, at Garvagh Bridge, one mile and a half west from Sperrin Lodge, one of the limestone beds referred to occurs. It is on the south side of the road, and is a hard gray crystalline rock with iron pyrites. Although lime is scarce hereabouts, this quarry was abandoned, partly from the difficulty of working it, and partly on account of the inferior quality of the material.

In that part of the district near Draperstown, south of the Carboniferous sandstone area, the streams expose sections of the same kind of rocks, particularly in the deep ravine lying west of the road from Cookstown to Six Towns, near the R.C. chapel, and in the glen of Altahaskey. They are shining thin-bedded schists, much crumpled and twisted, and a fault runs through the latter glen, the abrupt change in the strike of the beds being a noticeable feature.

Westward and south-westward from this to Mullaghcar little is to be seen but a gloomy cover of peat bog, the streams occasionally showing sections similar to those described. On the mountain, however, are some deserving special notice. One of the most important is that in Glenscollip burn, south-west from Mountfield. Here, as already mentioned, the actual junction between this series and the hornblendic, the supposed pre-Cambrian, can be seen, the former resting on the latter at an angle of 45° without any appearance of an intervening fault, although the great N.E. and S.W. fault runs a little higher to the north, as evidenced by the shattered condition of the schist. (See Fig. 1.)

The nearly parallel streams of Glencurry and that westward, near the margin of the map, expose similar rocks. In the latter brown garnets were observed, but by far the best locality for them

is the deep valley through which flows the Glensawisk burn, to the east of the mountain, where garnets and garnet-bearing schists are found in considerable quantity.

On the top of Mullaghcar, particularly near the summit, there is much glittering mica schist, and a mile N.N.W. of that point are deep abrupt hollows, the larger being called Glen Altascala, which have been worn along the strike of the beds. The stream sections on the northern flanks of the mountain exhibit the same chloritic and micaceous schists, and still further north, beyond the valley of the Owenkilley, is the second of the limestone beds already referred to as occurring in these schists. It is seen in the little stream near Golan bridge, close to the termination of the tongue of Carboniferous sandstone that extends from the west. The character of this limestone is similar to that before described at Garvagh bridge, of which it is probably a continuation. Like that too, a quarry was opened here, but was abandoned. The associated rocks are chiefly mica schists, generally more or less calcareous.

Some miles eastward from Mullaghcar, in the district south of Greencastle, there are very peculiar rocks. They show little schistose structure, and are usually massive, having in many places the appearance of igneous rocks, but they differ from the older series in being chloritic or talcose, and containing little or no hornblende. Cashel hill is mostly composed of these massive rocks, which to the south-west of the summit pass through felspathic schist into a rock undistinguishable from quartz porphyry, but on the north side, where a dip is marked on the map, the foliation and bedding are apparent.

Similar structureless rocks occur towards the east, at Formil, where huge blocks occupy the ground in the vicinity of the bridge, and to the north-east at Slievemenagh. On this hill they are for the most part very compact, resembling highly indurated or baked slate, and change, as at Cashel, through felspathic schist into quartz porphyry, undistinguishable from that of igneous origin, and weathering with the characteristic white crust. At the river side west of this hill a similar rock appears, and is also shown on the map.

The hill of Crockyneill, to the north, is also composed of these massive chloritic schists. Here, at Tomba, is a very instructive example, where part of a rocky mass is a talcose schist, while the rest has the structureless character prevalent about here, and shows the latter type to be but a variety of the former.

BASALT AND DOLERITE DYKES AND BEDS.

Very few of these occur in the district. That which is seen on the east margin of the map, traversing the granite, has been traced for about a mile and a half to the south-east, in sheet 27, and is doubtless one of the system of Tertiary dykes connected with the sheets of basalt. Where observed here it is vertical, five feet wide, and consists of very dark amygdaloidal rock.

Towards the centre of the map, close to where the great fault crosses the county boundary, is a small dyke of similar rock, weathering into an ochre, of which Portlock gives an analysis,

(see Geol. Report, p. 174). At Greencastle there is a very dark green jointy vesicular rock, not unlike many among the hornblendic series. Its connexion with the associated schists is obscure, but it is most probably intrusive.

In the north-west, a large dyke or bed of heavy dark dolerite occurs close to the top of Mullaghasturrakeen mountain. It seems to be connected with similar dykes or beds that are found plentifully over great part of the country to the north (sheet 18), and which are probably of Lower Silurian age. Like them, its course is parallel to the strike of the schists, though there is good reason to believe it to be intrusive, as some of the others were found in places to cut across the bedding.

AQUEOUS ROCKS.

LOWER CARBONIFEROUS SANDSTONES.

Lower Calcareous Sandstone.—The rocks described under this title are confined to the vicinity of Draperstown, in the north-east part of the district, except a small outlying patch towards the south-west near Mountfield.* They consist of coarse reddish-brown or purple sandstones and conglomerates, with occasionally earthy and flaggy sandstones and sandy shales, and good sections in them were observed in most of the stream courses and rivers, especially in the Moyala, west of Draperstown, and in the tributary to the same river called the White Water, two miles south-west from that town, where they can be followed up to the junction with the overlying beds. Throughout the whole of this section they are of the character just described—the conglomerates prevailing. These are often very coarse, the pebbles in some places being ten inches in diameter, and consist of schist and other metamorphic rocks, with white and pink quartz and hard red grits. The latter are particularly abundant in a conglomerate that is found about three quarters of a mile south of White Water bridge, and which bears a strong resemblance to one in the glen north of Killeeshil church, near Ballygawley (sheet 34). In both cases there is a marked scarcity of white quartz pebbles generally so prevalent in these beds, and an abundance of those of red grit, which in the latter case, appear to be derived from the "Fintona Beds" which they directly overlie.†

Several other good sections occur to the east of this, as may be seen on the map, and westward about Six Towns. In one of these, on the Glashagh river, a mile west from Cavanreagh House, a small vein of sulphate of barytes was found.

The outlying patch to the south-west, near Mountfield, consists of the same kind of pebbly sandstones and conglomerates. In the stream west from Cornagillagh bridge, they may be seen

* I have elsewhere suggested that these rocks might be classed as Old Red Sandstone. See paper "On the Old Red Sandstone of the North of Ireland." Quart. Jour. Geol. Soc., Nov. 1880.

† *Fintona Beds.*—A name designating that large tract of red conglomerate and sandstone lying south of Pomeroy and about the town of Fintona, formerly regarded as Lower Old Red Sandstone, but now generally believed to be the equivalent of the Dingle beds of the South of Ireland.

resting on the mica schist, but no junction with it, or the hornblendic series on the south-east, was observed. From the persistent S.E. dip of the sandstones they are here evidently bounded by a fault.

Owing to the many fault boundaries, the thickness of these sandstones could not be estimated, but a section measured at Six Towns gives a total of 1,500 feet.

Upper Calcareous Sandstones.—These are found both in the district about Draperstown, and to the south-east, forming part of the Cookstown series, and also to the west, being the termination of a considerable tract occupying much of the country about Gortin in the adjoining map (sheet 25). They differ considerably from the Lower series, and consist of white, yellowish, and red sandstones, grits and shales, with thin beds of arenaceous and earthy limestones, and quartz conglomerates, often highly calcareous. In several places they are fossiliferous.

The typical section of these rocks occurs in the White Water river, before mentioned, where they rest upon the Lower series, about a mile south of White Water bridge. The basal beds here are massive green or gray and yellow pebbly grits, and are succeeded by dark red sandstone and thin shales, with pebbly quartz calcareous beds. Farther on, where the stream bends to the east, there are thick-bedded pebbly grits, sandstones and conglomerates, dark purple or bluish shales and thin arenaceous limestones. These beds are cut up by numerous faults, and in some of them fossils have been found. Still farther, opposite the school, fossiliferous shales with thick pebbly calcareous beds, earthy limestones, and thin arenaceous limestones, again appear. The surfaces of some of the latter are curiously cracked like dried mud, while in section they present salient and re-entering angles like the edges of basalt dykes. There is also a peculiar conglomerate full of pieces of white quartz imbedded in a strongly calcareous base.

South of this, Carboniferous rocks re-appear in the eastern branch of the river, about 250 yards from its junction with the stream to the south, called the Black Water. The first beds met with are thick pebbly and thin earthy limestones, dark shales, and purple calcareous pebbly sandstones, like those before described. These are likewise cut up by small faults, and on some surfaces very distinct ripple marks were observed. Higher up are conglomerates with white and pink quartz pebbles imbedded in a sandy base, and having some look of those in the Lower series, but interstratified with them are thin earthy and pebbly limestones, shales, and the peculiar limestone noted near the school-house. Still farther up, quartzose conglomerates and pebble beds appear and continue to the fault boundary.

Another good section, though not so extensive, is to be seen on the Moyala river one mile W.N.W. of Draperstown. At the bridge there are black shales partly sandy, and thin argillaceous limestones, some of which exhibit the peculiar cracked surfaces before noticed. These are succeeded by fossiliferous dark shales

and hard sandstone, while, close to the fault, margining the alluvial flat, are whitish grey compact sandstones with light blue shales.

In the south-eastern portion of the district, rocks of this series occur in the Kildress or Ballinderry river. Those close to the granite, on the north side of the bridge, near the ruined church, are red pebbly sandstone with quartz conglomerates; on the south side no rock is seen, but at about 300 yards from the place where the river turns to the north-east, are red and white micaceous and highly calcareous sandstones. Quarries have been opened on these rocks and good building stones obtained.

At the eastern end of the alluvial flat and on the south side of the river, a quarry was opened in crystalline red fossiliferous limestone with shales, and in the river bank a little farther on there is more limestone. The continuity of the beds is here disturbed by a fault which shifts the limestone to the east on the opposite side of the river, where however little of it is to be seen at the surface, and its position was chiefly determined from the results of borings undertaken in search of hæmatite associated with it, as will be afterwards explained in the proper chapter. From these borings too, it appears that the limestone is also affected by a fault bearing N.W. and S.E., north of which it is only represented by a thin band, as shown on the map.

Over this limestone in the river are soft red or purple shales with a thin bed of white limestone, succeeded by flaggy grey and white shales, some tinted pink or greenish, over which are white sandstones and purple shales with lumps of earthy hæmatite, the last appearing beds at the junction of the faults being grey sandy ferruginous shales, under which are others of a red and white colour with peculiar green laminae. Hæmatite is also said to have been obtained here.

North of the Ballinderry river these beds are met with in the stream that flows by Gortin House, where they are fined-grained white sandstones with red streaks and green laminae, and similar rocks are exposed in a quarry close by the roadside.

In the western part of the district, the Carboniferous rocks north of Mullaghearn also seem to belong to the upper division, and bear a general resemblance to those just described, although limestone beds were not observed. A good section may be seen in the Trinamadan burn, close to the margin of the map, where, descending from the mica schist, we meet greenish grey sandstone and sandy shale, succeeded by thick-bedded grey sandstone, purple sandy shale, some beds being dolomitic, and green and purple calcareous sandstones, grits and shales. The extreme eastern termination of this tract is very interesting, the junction of these beds with the mica schist being well shown in the burn close to Golan bridge, where they appear in three shallow synclinal basins filling hollows in the older rock. To the south this formation appears to be bounded by a fault.

The true thickness of the Upper Calcareous series, like the Lower, could not be estimated owing to the faults, but at least 1,000 feet is here seen.

POST PLEISTOCENE—DRIFT DEPOSITS.

Lower Boulder Clay.—This deposit is pretty well spread over most of the district, especially to the north, where it is found on the flanks of the mountains up to a height of 1,250 feet. It is a stiff grey or brownish unstratified clay with boulders, usually local, or derived from contiguous localities, some of them being of considerable size and frequently glaciated. It here seldom forms any remarkable hills or distinctive features, being generally conformable to the surface of the ground or slope of the hill. In river banks, &c., there is generally a sharp line of demarcation between it and the overlying sands and gravels, and in some places the latter are quite unconformable to it. A striking example of this occurs on the White Water, of which a sketch is given in Gen. Portlock's Report, &c. Similar phenomena have been described in the memoir explanatory of the district to the south (sheet 34), and the sketch there given is sufficiently illustrative of the facts observed here. (See Memoir to accompany sh. 34, p. 21.)

Sands and Gravel.—These, which have just been referred to as overlying the boulder-clay, are also spread very generally over this area, and attain a considerable height, being found up to elevations of 1,200 feet. They consist of coarse gravels and sands alternating with beds of finer material, and contain, in addition to pebbles of local rocks, some others derived from comparatively distant sources to the east. Thick deposits are found in most of the larger river valleys, such as the Glenelly and Owenkillew, while in other parts they form terraces, abrupt conical shaped hills, or long and tortuous esker ridges. On the northern flanks of Mullaghearn mountain, south-east from Sperrin Lodge, a remarkable line of gravelly flat-topped hillocks may be observed. They trend towards the W.S.W., and form a rude terrace at a height of 1,000 feet. The valley on the other or southern side of this mountain is also thickly covered with sand and gravel. Here, in some of the stream sections, the boulder-clay is observed rising from beneath it, and extending to a much higher level.

In the vicinity of Mullaghearn there are numerous and extensive drift terraces. (See Fig. 1.) To the north of the mountain, near Gortin, a conspicuous line of these stretches from Boorin wood for a mile to the south-east, at an elevation of 900 feet, while lower down, at 300 feet, is another margining the flat bog south of Staree. On the upper terrace are several small lakes.

Eskers.—A remarkable ridge, called Davagh esker, extends from a little north of the county boundary, two and a half miles west of Lough Fea, skirting the western side of the bog and Davagh Water, from whence it extends south-westwards to Broughderg, where it apparently terminates in a grassy conical hill a little south-east of the bridge. This esker is of very varying breadth, in some places being a mere ridge, while in others it has a level top some 200 yards wide.

Another well-defined ridge, perhaps a continuation of the former, extends from about half a mile south of Blackrock and west of Craigard—where the road is carried along its top—southwards to the Omagh road, bounding the flat bog east of Teebane bridge, and thence south-westwards to Lough Doo. This esker is very narrow and tortuous. Where pits, &c., were opened it is seen to consist of alternations of fine sand and gravel, with coarse paving-stone gravel, disposed in layers more or less parallel to the sides.

About three miles west of this, close to the R.C. chapel of Creggan, is a smaller esker trending north-west, and farther west, north of Loughs Fingrean and Loughnapiast, are extensive deposits of sand and gravel often forming hills, of which the sharp conical one called Bauck hill is a notable example.

In the north-eastern part of this area, near Draperstown, a conspicuous line of esker fringes the hill S.W. of Glengomna bridge.

Upper Drift.—Overlying the sands and gravels and graduating into them, in some parts, particularly about Slieve Gallion, are deposits consisting of unstratified clay with boulders, often glaciated, and intercalated beds of sand and gravel. This constitutes a very important difference between these upper drifts and the lower boulder-clay, the demarcation between the latter and the gravels being, as before observed, strongly marked, and distinct unconformability sometimes shown. Examples of these upper drifts occur on the old mountain road leading northwards from Blackwater bridge where the following section was noted:—

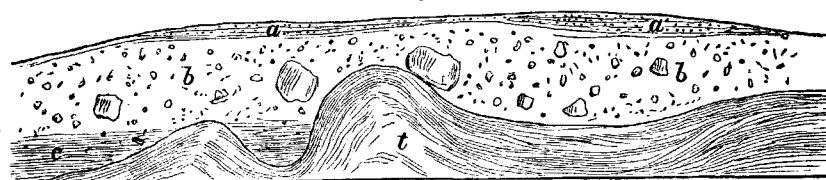
- | | |
|---------------|---|
| Upper Drift, | { 1. Unstratified sandy clay with moderately sized blocks and a few large ones apparently glaciated ; |
| Middle Drift, | { 2. Fine Stratified sands ;
3. Stratified sand and gravel ; |

and at Lough Patrick in the vicinity, where there is unstratified clay with blocks, and some intercalated beds of gravel, passing downwards into stratified fine sands and gravels with thin bands of clay. On the road half a mile east from Black Water bridge there is reddish brown clay with boulders, passing downwards into stratified sand and gravel.

On the flanks of Slieve Gallion there is also much drift, and it forms a rather extensive terrace on the north and west. It has a height of 850 feet, and is a conspicuous feature in the view of the mountain from the south-west. Rising from it on the north-west, are some noticeable hillocks of gravel and sand called the Crockandun hills, and numerous openings both here and in other parts of the terrace show arrangements of material similar to those described. A very interesting section was observed on the road-side west of the mountain, and close to the little tarn called Black Lough, of which a sketch is here given. (See Fig. 3.)

Glacial Markings.—Owing to the thick mantle of drift that prevails little opportunity is afforded for observing these phenomena, but sufficient were noted to show the general movement of the ice

Fig 3.



Section on road near Black Lough.

- a. Unstratified chocolate coloured clay.
b. Unstratified sandy clay with gravel passing into 'a,' and containing numerous boulders, some of considerable size.
c. Fine stratified sands and thin clays.
t. Talus.

over this area, which seems to have been towards the N.N.E. and N.E. Thus at Glengomna, three miles and a half W.S.W. from Draperstown, grooves bearing N. 10 E. were observed on hard quartzose schists in the river bed a little south of the bridge, and about the same distance S.W. of the town, near Lough Patrick, are striae bearing N. 35 E., while due south, on the Sruhannaclogh stream, half a mile from its junction with the White Water, are striated *roches moutonnées* that crag to the N.N.E. At Toneragh, in the southern part of the district, on the eastern side of the great bog, are grooves bearing N. 20 E., but there is no evidence to show what was the direction of the ice movement, yet from the evidence already adduced it was probably from the same quarter, and glacial markings with precisely similar bearing were observed on the rocky face of Cashel hill, just above the hamlet of Leaghan. At Oritor too, in the south-east, are *roches moutonnées* that crag to the N.E.

Remarkable exceptions to this general direction of ice-movement were also observed. The most striking of these is that at Mweela More, isolated rocky hummocks rising from the midst of an extensive bog one mile west of Creggan House, in the south part of the district. Though no striae were observed here, the rocks have a marked glaciated character, and undoubtedly crag to the south-east.

In the hilly country about Craigateora, some three miles westward from Lough Fea, many of the rocks are ice-dressed, though striae are rare. On one surface are wide grooves, apparently glacial, bearing E. 20 N. and the rock seems to crag to N.E. but a little further on are *roches moutonnées* that crag in the opposite direction. It is probable that besides the main movement of the ice to the N.E., there were others of a minor degree, to the southward, due perhaps to local glaciers having their sources among the hills to the north.*

RECENT DEPOSITS.

Peat Bog, Alluvium.—From the map it will be seen that the largest peat bogs in this district stretch across it from east to

* In the map on page 211 of Prof. Hull's Physical Geology and Geography of Ireland, a small snowfield is shown as having probably existed among these hills.

south-west, chiefly upon or bordering the area occupied by the hornblendic and pyroxenic rocks. The greatest of these has a length of nearly ten miles, with a variable width attaining three miles at the widest. The peat has an average depth of about ten or twelve feet, and rests, in general, either upon boulder-clay, or the sands and gravels, with in some places a marly unctuous clay interposed. There is also a considerable extent of peat in the vicinity of Lough Fea, where it is largely impregnated with iron, which in the form of bog iron ore frequently occurs in lumps over the adjacent lands, while in the stream cuttings and ditches bordering the roads an ochreous deposit was observed. This, according to Portlock, is partly due to organic agency, producing the floccy matter that floats on the surface, and "the yellow feathery bundles waving with the motion of the water to and fro, from the margin of the bank to which they are attached in a very graceful and curious manner," while the superabundant matter appears as an ochreous crust lining the bottom. (Geol. Report p. 647).

The remaining bogs and alluvial flats do not call for special mention, being limited in extent, and unimportant, except the alluvium of the Moyola river, near Draperstown, among the sands of which particles of gold are said to have been found.

CHAPTER III.

MINES, MINERALS, AND PRINCIPAL FAULTS.

Kildress.—In the Upper Calciferous series to the south-east hæmatite has been found over the irregular beds of limestone. The locality here referred to is close to the Ballinderry river, at the south side, where on sinking a pit, lumps or nodules of ore were found in a bed of brownish red shale, portion of which is itself highly ferruginous. Over the continuation of the limestone bed to the north-east, it was also discovered in many sinkings, and still more in the country within the area of the adjoining sheet, 27, in the accompanying memoir to which a more detailed account is given. Exhaustive trials on these beds were made some years ago by the Barrow Hæmatite Company, but seem not to have been attended with much success. An interesting paper on the occurrence of this ore by Mr. Hardman will be found in the Jour. R.G.S.I., vol. xiii. part 3, new series.

Tullybrick.—This locality is situated about six miles to the south-west of Draperstown, south of the hill called Altahaskey. The rock is one of the micro-crystalline to compact varieties of the hornblendic series, very silicious, being changed in some parts into an iron jasper. Pockets containing micaceous and specular iron ore occur, some of which, according to Portlock, are titaniferous. At Beaghbeg, near Tonaragh, five miles to the south-west, a little of this mineral was also found.

Teebane.—A lode containing galena with iron pyrites, was discovered to the west of Greencastle, in the streams immediately

below Fashioner's-bridge, and Pollanroe-bridge, being apparently faulted between these localities. It bears N.N.W. and S.S.E., having steeply to the west. It was said to have been worked some thirty years ago, and re-opened more recently by Mr. Hope, proprietor of the district, but not being found to pay was abandoned. Some of the galena was taken by manufacturers of pottery near Lough Neagh, for glazing their wares.

Cavanreagh.—A thin vein of sulphate of barytes was observed among the sandstones in the Glashagh burn, at the fork of the stream one mile west from Cavanreagh-bridge, near Draperstown. It does not seem to be of any importance.

Principal Faults.—On looking at the map, it will be seen that the largest fault in the district is that which traverses the map from north-east to south-west, with a downthrow to the north. This forms the south-eastern boundary of the Carboniferous series at Sixtowns near Draperstown, and of the smaller tract near Mountfield, to the south-west. In the former place, it is a well-marked feature as seen from the hills to the north, the Carboniferous rocks occupying comparatively low ground sloping gently to the river, while the schistose country on the south-east, rises somewhat abruptly to a tableland, extending to the hills south of Lough Fea. In the central parts of the map there is little trace of the fault, though sufficient evidence is afforded by the alteration in the direction of the dips along the line of its course.

Another large fault traverses the centre of the old gneiss and schist district to the south-east. It crosses north of Lough Fea, and forms the southern boundary of the Carboniferous rocks at the White Water, extending from thence into Sheet 27. Both these are of pre-Tertiary age as they do not affect the basalt. The lesser faults to the south-east, near Craigard and Wellbrook, are proved by the marked change in the strike along their course, and in the latter case by the juxtaposition of the hornblendic series and the schists near Moor House, and the shift of the limestones in the Kildress or Ballinderry river.

The north and south fault which passes about a mile and a half west of Draperstown, seems to be the most recent, and can be traced for a considerable distance in the country to the north, and north-north-east, in Sheets 18, 19, and 13. In the first of these, it forms for several miles the boundary between the basalt and the schist, while in the latter, it traverses the former rock. It is not only well proved from the transverse strike of the Carboniferous beds in the White Water, but is visible in the little stream south-east from Labby Vale Cottage. There the schists and sandstones are almost in contact, the latter dipping against the former, as shown on the map.

In the western part of the district, a fault appears to bound the Carboniferous rocks at Golan. It seems to have a more southerly course about Staree, a mile south-west of which it leaves the limits of this sheet, and is continued in that adjoining, where there is further evidence of its course.

CHAPTER IV.

PALÆONTOLOGICAL NOTES.—LOCALITIES from which FOSSILS were collected.

No. of Locality	Quarter Sheet of 6-inch Map.	County and Townland.	Situation, Geological Formation, and Sheet of 1-inch Map.
1	40/2	County of LONDON-DERRY. Strawmore, . . .	At north-east corner of Map; rocks in Moyola river a little south of road from Draperstown to Mullens-bridge; one mile west of Draperstown; dark gray arenaceous shale. "Lower Carboniferous, upper group on Map."
2	40/4	Cloughfin, . . .	At north-east corner of Map; rocks in Whitewater river, one and a half mile south of Whitewater-bridge and two miles south of Draperstown; dark gray arenaceous shale. "Lower Carboniferous, upper group on Map."
3	29/3	County of TYRONE. Kildress, Lower, . . .	At south-east corner of Map; quarry in field close to Kildress river, half a mile east of Oaklands and two miles west of Cookstown.

LIST of the FOSSILS collected from the LOCALITIES mentioned in the preceding TABLE.

The numbers opposite each species refer to the places at which they were collected, and the mark × placed before them denotes their comparative abundance.

CARBONIFEROUS SERIES.

ACTINOZOA <i>Zoantharia</i> .		Localities.
Lithodendron affinis,	3	
Lithostrotion striatum,	3	
<i>Brachiopoda</i> .		
× × <i>Athyris plano-sulcata</i> ,	3	
<i>Productus giganteus</i> ,	3	
" <i>punctatus</i> ,	3	
<i>Rhynchonella pleurodon</i> ,	3	
<i>Spirifera striata</i> ,	3	
<i>Streptorhynchus crenistria</i> ,	3	
<i>Terebratula hastata</i> ,	3	
<i>Lamellibranchiata</i> .		
<i>Modiola Macadami</i> ,	2	
<i>Pinna flabelliformis</i> ,	3	
<i>Heteropoda</i> .		
<i>Bellerophon</i> , sp. indeterminable,	3	
<i>Crinoidea</i> .		
<i>Actinocrinus stem</i> ,	3	
<i>Crinoid joints</i> ,	3	
CRUSTACEA: <i>Ostracoda</i> .		
<i>Leperditia Okeni</i> , var. <i>subrecta</i> ,	× × × × 1, × × 2	

LIST of FOSSILS from Lower Carboniferous Strata, Kildress, county Tyrone, collected by the Ordnance Survey, now in the Palæontological collection of the Geological Survey of Ireland, specifically identified according to present nomenclature, with Colonel Portlock's names as synonyms:—

ACTINOZOA: <i>Zoantharia</i> .		Portlock's Report.
<i>Chaetetes tumidus</i> ,		<i>Favosites tumida</i> (Ph.)
<i>Cyathophyllum</i> , sp. indet., in quartz grit.		<i>Astrea irregularis</i> (Portl.)
<i>Lithostrotion</i> Portlocki, do.,		
<i>Polyzoa</i> .		
<i>Fenestella antiqua</i> ,		<i>Fenestella flabellata</i> (Ph.)
<i>Polypora polyporata</i> ,		" <i>polyporata</i> (Ph.)
<i>Brachiopoda</i> .		
<i>Athyris ambigua</i> × × × ×,		<i>Atrypa sublobata</i> (Portl.)
<i>Chonetes Hardrensis</i> ,		
<i>Lingula mytiloides</i> ,		<i>Orthis fliariz</i> (Ph. sp.)
<i>Orthis Michelini</i> ,		
<i>Productus punctatus</i> ,		
" <i>semireticulatus</i> ,		<i>Terebratula pleurodon</i> (Ph.)
<i>Rhynchonella pleurodon</i> ,		
<i>Spirifera laminosa</i> , in quartz grit.		<i>Spirifera octoplicata</i> .
<i>Spiriferina cristata</i> ,		
MOLLUSCA.		
<i>Aviculopecten ellipticus</i> , in quartz grit,		<i>Inoceramus pernoides</i> .
<i>Sanguinolites plicatus</i> ? do.,		<i>Unio</i> .
<i>Macrocheilus imbricatus</i> ,		<i>B. globatus</i> ? (a Devonian sp., now <i>sub-globatus</i>).
<i>Bellerophon apertus</i> ?		
<i>Orthoceras latissimum</i> ,		
<i>Crinoidea</i> .		
<i>Actinocrinus variabilis</i> , joints.		
CRUSTACEA.		
<i>Phillipsia pustulata</i> ,		

REMARKS ON THE FOSSILS.

The recent collection of fossils from the area included in this sheet of the Map are from three localities only, all being in rocks of the Carboniferous series; two of them are situated at the north-east corner, and one at the south-east.

At the two first described localities (Nos. 1 and 2, near Draperstown) the fossils and their matrix appear to be identical both lithologically and palæontologically, and to be equivalent to what has been usually called Lower Limestone Shale; at both localities the fossils occur in dark arenaceous Shale; at No. 1 they consist entirely of small bivalved shells of Entomostracan crustacea, *Leperditia*; at No. 2 the same fossils were associated with the characteristic Lower Carboniferous Molluscan Shell *Modiola Macadami*.

At locality No. 3, which is widely distant from the two just described, the lithological character of the rock resembles very much the Carboniferous Limestone of Cookstown, near which it is situated, and that of Armagh, being a compact red or pinkish limestone, with numerous fossils, corals, crinoids, and Mollusca, amongst them Brachiopods being most frequent.

In the old collection of the Ordnance Survey, now included with that of the Geological Survey of Ireland, there is a set of fossils from the

same townland, Kildress, county of Tyrone, most of which are described by Portlock in his report* as "a red grit, full of fossils, occurring on the river Kildress, some Carboniferous and others doubtful." Perhaps from the colour of these fossiliferous beds as well as from their supposed position with relation to the Lower Carboniferous rocks, they were considered by some Geologists as Devonian or Old Red Sandstone, they are, however, now assigned to their proper position, as being characteristic Lower Carboniferous species. Most abundant amongst them are the small Brachiopod shells, *Athyris ambigua*. Besides these thin bedded fossiliferous grits there are Quartzose beds containing numerous Bivalve shells, all being in the state of casts, but well exhibited; conspicuous amongst them are *Aviculopecten ellipticus* (which, in the preceding list of these fossils, is believed to have been Portlock's *Inoceramus pernoides*), and others I consider to be most probably casts of *Sanguinolites plicatus*, described and figured by Portlock as *Unio*.

WILLIAM HELLIER BAILY.

November 18th, 1882.

* Geology of Londonderry, Tyrone, and Fermanagh, pp. 489, 565, &c.

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