Memoirs of the Geological Survey.

EXPLANATORY MEMOIR

TO ACCOMPANY

SHEET 33 OF THE MAP

OF THE

GEOLOGICAL SURVEY OF IRELAND,

INCLUDING THE

DISTRICT ROUND OMAGH, FINTONA, AND IRVINESTOWN.

BY

SIDNEY B. WILKINSON AND J. R. KILROE.

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

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PREFACE.

THE area included in this Map contains a remarkable variety of rocks and formations; and is also complicated in its structure, which has been illustrated by Messrs. Wilkinson and Kilroe in the joint construction of the geological map and Memoir; the former having worked the southern, the latter the northern portions of the map.

The district is one which has been subjected to much terrestrial disturbance, resulting in the formation of two main lines of fracture, or faulting, running in E.N.E. directions, between which the old metamorphic rocks have been upheaved, and by the process of denudation have been brought to light. The more southerly of these faults, which ranges along the southern base of Greenan Mountain, would seem to be of two distinct, and possibly widely separated, periods, as may be inferred from its relations to the Carboniferous and Old Red Sandstone formations, and the shifting has been in opposite directions.

The red, purple, and greenish shales, sandstones, and conglomerates, which compose the southern portion of the sheet, are considered to be of the age of "the Dingle and Glengariff Beds" of the south of Ireland, and are also representatives of the "Lower Old Red Sandstone" of Scotland. They are probably of lacustrine origin, and have so far proved altogether destitute of fossils. They are referred to by the late Sir Richard Griffith in his paper on "The Old Red Sandstone," in the British Association Report for 1843, p. 46. No representatives of the Upper Old Red Sandstone are found in this district. The metamorphic rocks near Omagh form part of the range described by the late Professor Harkness as being of Silurian age, subjected to excessive metamorphic action. *Ibid*, 1863, p. 70.

EDWARD HULL.

Director.

GEOLOGICAL SURVEY OFFICE,
DUBLIN.

January, 1886.

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EXPLANATORY MEMOIR

TO ACCOMPANY

SHEET 33 OF THE MAPS

OF THE

GEOLOGICAL SURVEY OF IRELAND.

General Description.

Of the area described in this Memoir the greater part lies in Tyrone. It also includes about thirty-six square miles of Fermanagh, in the west. The chief places are Omagh, the county town, and the smaller ones, Fintona, Drumquin, and Dromore, in Co. Tyrone; together with Irvinestown, Lack and Ederney, in Co. Fermanagh.

Physical Geography.

Northern Part.—The valley in which Omagh is situated lies between the high ground ranging W. by S. towards Lack, and the Mullaghcarn group of hills, the S.W. slopes of which just enter the sheet in the N.E. corner. Towards Lack the range referred to culminates in Dooish (1,119,) the highest point in the district, by the foot of which the main road passes connecting Dromore with Drumquin. This road runs along a transverse valley which severs the range into two nearly equal parts, E. and W.

A craggy peat-covered tract in the N.W. corner occupies an area of about twelve square miles, and contains the Bolaght (1,117) and Bin (1,099) mountains, near the north margin. An isolated hill, Dunnaree (850), overhanging Drumquin, stands in the angular space between the tract just described and the Dooish group; separated from the former by a valley running south-westward by Willmount and Sloughan, and from the latter by a glen about two miles long, passing throughCool and Glenrone.

The country S. of Omagh is generally level, averaging 300 feet above the sea. It falls away gently northward, the average elevation at Omagh being 250 feet, which is about five feet higher than the river alluvium at Mountjoy, the lowest ground in the

sheet. The surface is studded with hillocks of irregular shapes, and of various heights, some of which rise to 90 or 100 feet above the adjoining flats.

The general level of the district between Mountjoy and Drumquin is broken by an elevated tract, which slopes upwards from the main road, on the right hand travelling from Omagh to Drumquin, reaching a height of 534 feet above datum. This mass—falling away towards Drumquin on the west, and towards Tarlum, half-way between Drumquin and Omagh, on the east—is truncated northward by an escarpment running E. and W. at Claraghmore, which overlooks the extensive boggy flat of the Fairy Water.

J. R. K.

Southern Part.—The southern portion of the sheet (mapped by Mr. Wilkinson), is bounded on the north by a line running E. and W. by Hill-head, Widow Magee's Bridge and the Holme, then following the boundary of the Counties Fermanagh and Tyrone, northwards to Lough Mulhern, from this place due W. to the margin of the sheet. The highest ground lies N. of Lack. Tappagan mountain, being 1,112 ft. above sea level, slopes south till it reaches the low-lying lands, which extend all over the southern portion.

The western part of this section is drained by the Glen Derragh river, which runs from Mullaghglass through Ederny, eventually reaching the Erne water, also the head waters of the Ballinamallard river (which also runs into the Erne) rise in the low-lying lands in the neighbourhood of Stralongford Bridge and the Diamond.

The Owenreagh river, which rises in the high ground S.E. of Fintona, and south of this sheet, runs in a northerly direction E. of Dromore, and leaves the southern portion at Widow Magee's bridge, and that, with the Fintona river, which drains the country between Fintona and Omagh, eventually run into the estuary of the Foyle at Lifford.

S. B. W.

Drainage.—The Drumragh River, flowing northward, and the Camowen, entering the sheet from the east, unite at Omagh to form the Strule, which, winding through alluvial flats, leaves the sheet by the N. margin at Mountjoy.* The former branch is formed by the junction of the Owenreagh and Fintona rivers; and the latter branch receives tributary streams† on the N. side,

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* I am indebted to Mr. Carson, proprietor of the "Tyrone Constitution," for the following note on what is still known as "Mountjoy Forest," N. of Omagh. To a great extent it was planted between 1785 and 1802, and included about 36,000 acres. An area of some 200 acres, lying on both sides of the Strule, is believed to have been primeval. The original owner was Right Hon. Viscount Mountjoy, but the Blessington estates having been disposed of, including the forest, a clearance commenced about forty years since, and a few hundred acres of it are all that now remain.

† One of these, the Killyclogher burn, yields the water supply for Omagh.

two of which lie within this sheet, draining the southern slopes of the Mullaghcarn group. The Drumquin river, taking its rise near the top of Tappaghan mountain, and flowing through Glenrone, with its tributary streams, drains the high grounds S. and W. of the town. It contributes, with the Gillygooly and other burns flowing northward, to the Fairy Water, which flows south-eastward through bog and alluvium to join the Strule.

Rock Formations and Divisions.

Aqueous Rocks.

Name.			Colours and Signs on Map.
Recent and Post-Glacial.	Peat (bog), alluvium, and other superficial deposits,		*Raw umber.*
	Old river alluvium and gravels,		*Burnt sienna.*
Post-Pliocene,	Drift, boulder clay,		*Engraved dots.*
Carboniferous Series.	Yoredale Sandstone,	d^3	*Yellow, and red dots.*
	„ Shale,		*Light indigo.*
	Upper Limestone,	$d^{2'''}$	*Deep Prussian blue.*
	"Calp," or Middle Limestone.	$d^{2''}$	*Dark indigo dotted yellow.*
	Lower Limestone,	d^2	*Light Prussian blue.*
	Lower Carboniferous Shale,	d^1	*Prussian blue and Indian ink.*
	„ „ Sandstone,		*Do., dotted yellow.*
	Lower Old Red Sandstone (Dingle beds).	b^6	*Indian red and purple.*

Metamorphic Rocks.

Micaceous and Hornblendic Schists,	μ	*Pale pink.*

Igneous Rocks.

Felstone,	F	*Vermillion.*
Dolerite or Basalt,	B	*Burnt Carmine.*

Metamorphic Rocks.

Four areas of metamorphic schists occur in this sheet, viz., the range stretching south-westward from Omagh towards Lack: a second in the north-east corner; and two smaller ones E. and S. of Omagh, each about a mile from the town. That to the south of Omagh is well seen in the railway cutting, where it is thrown up by faulting against Carboniferous limestone on the north, and against rocks of the Lower Old Red Sandstone age on the south. It consists of dark green talcose hornblendic schist, passing up into light gray highly siliceous rock in the N. end of the section. Both varieties effervesce with acids, the latter more than the former. Chlorite and thin bands of carbonaceous shale are met with throughout the section

The foliation is waved, in places contorted; and, near the S. end, apparently folded—where, moreover, a quantity of infiltered white quartz may be seen. The north end shows marked evidences of faulting in the immediate vicinity. About the middle of the cutting, near "Greer's Bridge," occurs a band of unaltered red shale, three or four feet thick, containing partially formed, or weathered nodules (?) of a dark green tough variety of rock.

To the east of Omagh, where the river bends sharply west, at the weir, a somewhat similar talcose schist occurs, with wavy foliation, the talc being accompanied by chlorite. It is immediately associated with, if not itself part of, conglomeratic rock, with rounded quartzite and other pebbles. It dips N.W. beneath ordinary gray schist; and, like the small metamorphic area just described, is faulted up against Carboniferous and Old Red Sandstone rocks.

The schist in the N.E. corner is of the ordinary kind, gray and greenish in colour, mica predominating in places, felspar elsewhere, producing a more massive and solid variety of rock. The mica is often dark green, but usually silvery white. Gray felspar predominates, though in places it is pink, and associated with quartz; so that the rock possesses the constituents of gneiss and granite. Occasionally, a mineral like talc accompanies the felspar and mica, a highly talcose schist being met with in a quarry on the roadside in the middle of the townland of Killybrack, nearly two miles N. by E. from Omagh. A good section is seen in Killyclogher burn, though the bedding is peculiarly tossed and broken north of the Omagh waterworks, suggestive of a line of weakness along the valley. Several varieties of rock occur here, some of which contain hornblende with mica, others a black mineral, probably pyroxene; talcose schist, and black carbonaceous shale or decomposing schist.

All the above varieties are met with in the larger metamorphic area, W. by S. of Omagh. Indeed there is a marked correspondence in general character between the rocks of the two areas. Chloritic schist is found at several points along the S. slope of the eastern half of the range W. of Clanabogan. Talcose schist and black carbonaceous shale, as above described, are here also seen in various sections; and the latter may be traced in two or three well-defined bands. One of these strikes along the north and another along the south slope of the range. Hornblende is rare, but occurs with epidote (?) on the hill-top E. of Corraghnamulkin National School, which is situated in the valley separating Dooish from the eastern part of the range.

Thin bands of quartz-schist are met with on the S. E. slope of Dooish; and a more important band is indicated S. of Dooish on Greenan hill, whose continuation eastward across the burn is not provable. It probably thins out altogether. In this (*i.e.* Greenan) Burn, garnets were observed at three points, in gray silvery schist. They were also found at Glenfern, N.W. of Clanabogan, in the Tattykeel burn, and at a second point still higher up the same stream.

J. R. K.

The ground in the neighbourhood of Lack is occupied by silvery gray micaceous schists, stretching in a N.E. direction; in some places they become chloritic schists, also rather quartzose. The dip is high, varying from 25° to 80° with a N.W. direction. A good section may be seen in the stream running down from Mullaghglass, N. of the village of Lack. The area occupied by these rocks, in the southern portion of the sheet, is small, joining the mass that trends towards Omagh.

S. B. W.

Lower Old Red Sandstone.

"Dingle Beds."

The prevailing dip over the area occupied by this formation in the north half of the sheet is west. Hence the beds generally strike *at* the line separating them from those of the metamorphic area just described, which proves the existence of faulting on a large scale along that line. There is even a disposition in the strike to assume parallelism to the fault, the dip of the beds being north chiefly, though this is sometimes reversed. This will be again referred to in the chapter on faulting; and we meantime pass on to a description of the varieties of rock forming this member.

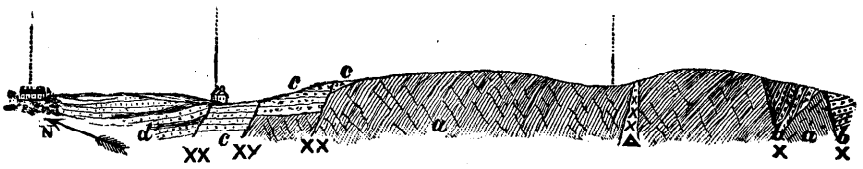
The numerous openings in the beds throughout the area present a great variety in detail, though all, even the most diverse in character, are linked together by a common general aspect. Pinkish-brown grit, and purple or red arenaceous shale predominate; often found in distinct openings, but usually associated, perhaps alternating, in the same opening. A peculiar band of light gray soft sandstone runs along the south side of the fault line W. of Clanabogan, accompanying the main or N. branch after it divides.

The rocks S.E. of Fintona are similar to the above, although at least two bands of conglomerate, containing pebbles of green and greenish-gray grits, and of purplish porphyritic felstone, accompany the usual brown and purple slate and grit in the higher ground near the town. In the townland of Lacagh, at the spade factory, 2½ miles S.E. of Fintona, purple and red conglomerate beds overlie grit which yielded building stone for the Fintona "new bridge;" it also yields door-steps and window-sills. The grit is mottled with green patches, which are calcareous, and sometimes nodular. Such mottling is not uncommon in the north half of the sheet.

Considering the constancy of westward dip, and the faulting already referred to, one might scarcely hope to find basal beds anywhere within the area south of the fault line. Mica flakes are of almost universal occurrence throughout the beds, and scattered white quartz pebbles are also occasionally met with, attesting clearly enough the origin of this portion of the forma-

tion; but a clearer link with its origin is found in a true basal bed, consisting of mica schist breccia, which is brought up against higher Old Red beds by a S.W. fault through Corrasheskin. The bed referred to is seen in a stream separating Corrasheskin from Cornavarrow, just before it enters the boggy flat 3½ miles N. of Dromore, at the point indicated on the map by a waved arrow. (Consult Section 1.) Nor is this all: A small area of Old Red Sandstone S.E. of Omagh has escaped the denudation which, both before and since the Carboniferous epoch, laid bare the schists elsewhere N. of the line of fault. The only sections available in this interesting area are two,* both evidently showing basal beds, or those which are nearly so; one, seen in the river bank S. of Cranny bridge, where a mica schist breccia, closely resembling that seen in Corrasheskin, referred to above occurs; the other section shows purplish sandstone, with embedded schist and quartz angular and sub-angular fragments, seen in a small glen S.W. of Killyclogher bridge, in the townland of Mullaghmore. The lowest beds of the Carboniferous formation in the district are also red, and closely resemble those just described, particularly N. of Omagh, where a considerable thickness of this variety of Lower Carboniferous shale, &c., is traceable along the mountain foot towards "the gap" S. of Gortin, the base, moreover, consisting of schist breccia. The small outcrop S.E. of Omagh, therefore, might easily be considered of Carboniferous age, especially as its character is gleaned from such meagre data; the reason for treating it as Old Red Sandstone, however, will appear further on.

Section 1.—*South-eastward through Drumquin, across the Metamorphic Ridge.*



References: *a.* Metamorphic schists; *b.* Lower Old Red Sandstone (Dingle Beds); *c.* Lr. Carb. Sandstone, &c.; *d.* "Calp" Sandstone, &c.; x, Pre-Carboniferous fault; xx, Post Carb. fault; Δ Dolerite dyke.

Returning, meantime, to the wedge-shaped area included between the two branches of the great fault, W. by S. from Clanabogan, a stream flowing S. through Aghadulla exposes a conglomerate, consisting almost wholly of variously coloured felstone and white quartz pebbles. Somewhat similar beds are met with in Cranny burn, at the mill; and higher up the course of the same stream, near the bridge, S.E. of Farm Hill, conglomerate and breccia, made up of felstone pebbles and felspathic

* James Greer, Esq., J.P., kindly informed me of an opening he had made upon *red argillaceous sandstone*, in a field opposite the cottage on the main road in Campsie, near where it is joined by the old road from Crévnagh House, which goes to confirm the opinion stated above as to the age of these rocks.

debris, are found in contact with the mass from which their materials have been derived. A compact breccia or volcanic agglomerate occurs in a section near the road, in the townland of Ballygowan, W. of dip "20" on the map, half-way between Omagh and Clanabogan. This is, doubtless, in immediate connexion with the outcrop of felstone, S.W. of Omagh. It is worthy of remark that in each of the above localities the felspathic agglomerate occurs westward of its parent mass; even that first referred to in Aghadulla lies westward of the mass of felstone, which is now almost wholly concealed by the S. branch of the fault. This is the more remarkable since no trace of such agglomerate is found to the *east* of these outbursts or interbedded flows; and in one instance, where an almost direct contact is seen, in Cranny burn, an ordinary purple sandstone dips away from the felstone towards the east.

J. R. K.

In the southern portion of the sheet the beds of Lower Old Red Sandstone are seen in several openings and streams. N. of Fintona in the river there are purple grits and shale beds dipping N.W. at 25°; the grits have a peculiar porphyritic appearance, owing to a large percentage of the pebbles being felstone. At Dromore beds of red shales occur, mottled in some instances, and further south, between Trillick Castle and Milltown, there are frequent exposures of purple sandstone, generally flaggy, alternating with bands of purple and red shale, mottled with greenish marks; flecks of mica may be seen throughout all these beds.

Here the beds are almost horizontal, and where there is any inclination to dip it is in a N.W. direction. About the town of Irvinestown openings are numerous, and the beds dip rather more to the south at an average of about 5°; they are the same purple, arenaceous beds, with a few beds of fine grit.

At Fairy Hill National school, purple sandstone and shale dip S.E. at 20°; this is immediately S. of the line of fault. N. of this fault, which will be referred to later on, a band of very peculiar conglomerate, about one mile broad, is bounded N. and S. by two faults, running parallel in a N.E. and S.W. direction, the beds being nearly vertical, and striking N.E. and S.W. The pebbles of these conglomerates are large, and are of quartz, quartzite, schists, (mica and chloritic,) and felstone, or quartziferous porphyry; the latter predominate, and give to the whole mass a singularly felspathic ash look; they weather a creamy pink colour. It is a massively bedded conglomerate, and runs in a well marked ridge; the upper beds immediately south of the northern fault are red and purple sandstones, and fine grits; these beds stretch in a N.E. direction into the northern portion at Greenan Bridge.

S. B. W.

Lower Carboniferous Sandstone and Shale.

The massive beds of pale grit, &c., of the N.W. corner, are represented in the eastern portion of the sheet near Omagh, so far as can be ascertained, by dark gray shale, with thin beds of sandstone, and dark gray shaley limestone. This may be observed in the river bank at Omagh, between the bridge and the gaol; in an artificial opening near Lisanelly House; and in the burn S.W. of Killyclogher bridge. These beds overlie a conglomerate, which seems to form the base of the series N.E. of Omagh—the actual base is not seen here. Numerous local blocks of this conglomerate lie scattered over the shallow Drift on the hill N.E. of Killyclogher R. C. Chapel. An assemblage of pale sandstone blocks, splitting easily into thin flags, occurs east of Cappagh Church, in a manner indicating that the solid rock beneath is not deeply hidden, as well as its nature. Openings on the rock are very rare in the locality; and, with the exception of one interesting section, the above data yield all the available evidence for the character of this member over the entire extent of its outcrop, in the eastern portion of the sheet. The section referred to is observed in the banks of a stream flowing westward south of the Chase Farm ("Mountjoy Forest") and shows, firstly, a breccia, almost in juxtaposition with the metamorphic rock whence the materials have been derived, and consisting of layers of angular white quartz fragments, embedded in soft red argillaceous sandstone, which also contains numerous small pieces of decomposed schist. Further west, and overlying the breccia, are seen beds of red shale and purple argillaceous grit, dipping W. at 20, which might be taken for Old Red Sandstone, as this is represented S. of Omagh.

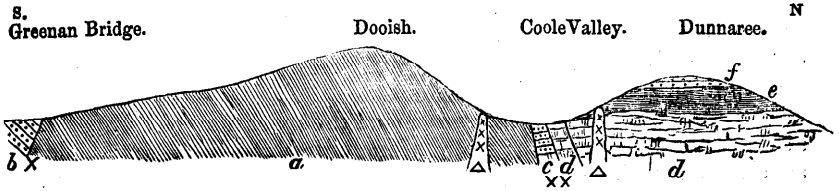
A quarter of a mile to the south, in an artificial water-cut, just before it discharges into the small boggy flat southward, has been observed dark gray and greenish shale, dipping twenty degrees north of west; and, therefore, appearing to underlie the red beds which ought, as elsewhere, to occur lower down in the series—if the irregularity of dip be not evidence for an unconformability. The red beds would then be of Old Red Sandstone age. A fault, however, is provable by independent data, to pass near to the section in question, sufficiently close to disturb the beds of gray and greenish shale, so as to make their strike conform to its own direction. This would both account for the irregularity of dip, and leave ample room for considering the red beds the continuation southward of similar strata which occur at the base of, and conformable to, unmistakable Lower Carboniferous strata, to be described in the Memoir accompanying the Newtownstewart sheet (25). On the other hand, it may not be out of place here to state the grounds upon which the red beds S.E. of Omagh are considered to be not of Carboniferous, but of Old Red Sandstone, age To suppose them to be the former would evidently imply a post-Carboniferous movement, that is, a reversal of throw, along $3\frac{1}{2}$ miles of the older fault, south of the two small metamorphic areas, which, though certainly possible, is an extreme conjecture, and untenable for lack of positive evidence, especially as the beds in question

are at least as closely connected in character with undoubted Lower Old Red Sandstone, south of the line of fracture, as with the red beds at the Chase Farm.

Red and pinkish-brown sandstones, containing white quartz pebbles, associated with red and greenish shale, are met with in the small area of this formation, brought up against the Calp sandstone S.W. of East Longfield Glebe House, and likewise faulted against the schists on the south and east sides of that area. A schist-breccia resting on the metamorphic rocks, obviously the continuation of a basal bed of the small area just described, has escaped denudation on its S. side beyond the fault, as indicated on the map and (*c*) in Section 1. South-east of the Glebe a still smaller area of Lower Carboniferous sandstone rests on the schists—contact being almost visible—also brought up against the Calp sandstone on the N., along the great fault there indicated. A considerable thickness of these beds is exposed in a narrow wedge-shaped area between the two branches of this fault, at the entrance of the Coole valley; they consist of the following series of beds, beginning at the uppermost:—

Hard pinkish-gray and purple sandstone, at the west end of the small alluvial flat near Coole bridge. At the opposite extremity of this flat eastward, also in the river, is seen dark gray or green fine-grained sandstone, passing down into hard pinkish-gray grit, and massive pale sandstone, which is in parts pebbly—pebbles up to 2½ inches in diameter. These varieties in turn overlie purple sandstone with pebbles of white and pink quartz.

Section 2.—Across Dooish and Dunnaree Hills.



References: *a*. Metamorphic schists; *b*. O. R. S. ("Dingle Beds"); *c*. L. C. Sandstone; *d*. Upper Limestone; *e*. Yoredale Shale; *f*. Yoredale Sandstone; Δ Dolerite; x, faults.

Lower Limestone.

This division is represented in the N.W. corner of the sheet by light gray compact limestone, on the east side of Crockalaghta. On the N.W. side of the same hill is observed dark gray thick-bedded limestone, which passes down through an arenaceous variety of this rock into massive grits containing beds of limestone, and the lowest of these beds is taken to indicate the downward limit of the present division. The position of these limestones also, in the grits, indicates a digression from the normal character, through an increase of the sedimentary ingredient, northward. It seems to be one of these beds which is converted into a highly crystalline dolomite, between the faults, as seen in the east bank of the stream flowing through Killen Gap. (See p. 29).

Crossing the fault, the Lower Limestone is traceable eastward beneath the summit of the Bin Mountain. It becomes perceptibly more earthy and arenaceous, and contains, even in its higher portions important bands of sandstone, one of these forming the "Bin Rocks." It reappears within this sheet at Calkill, about ten miles eastward, where its character is scarcely recognisable in any available section. The rock is, doubtless, present here, however, and yields stone for burning, though when long exposed there are few beds which do not weather into a soft sandstone. No openings occur by which its continuation may be traced toward the outcrop west of Omagh, but it is assumed to lie in the low ground along which the Strule flows, a displacement of boundaries, such as indicated, harmonising with the position and direction of throw of the various lines of fault. Dark gray limestone, in thin beds or flags, may be seen at the last point referred to, viz., W. of Omagh.

S. of the town several openings have been made on the rock through the overlying Drift—here from six to fifteen feet in thickness—the value of the stone for burning, &c., being such as to warrant the expense of working the quarries. There are three principal openings, of which that nearest the town shows very dark, compact limestone, with more or less sand, minute flakes of mica, and occasional pebbles of white quartz, generally subangular Thin beds of black clay are also to be seen, containing similar pebbles. The beds vary in thickness from 2′ 6″ to flags of 4″ thick, the latter being quite arenaceous.

In the opening nearest the railway bridge ("Dromore Crossing") dark blue limestone occurs in very massive beds—excellent for lime, which is here systematically burnt. And westward of the first, a third opening shows compact clean-fractured limestone, with black shale, which contains thin limestone beds, passing up into light gray calcareous sandstone.

The limestone in the western part of the sheet may be estimated at 350 feet in thickness; though, including the sandstone beds, as above explained, indicated on the map, the aggregate would reach 600 feet for this member.

The necessary data for such an estimate at Calkill or near Omagh are altogether wanting.

Middle Limestone or "Calp Series."

More than half the Carboniferous area in this district is occupied by the middle division, which consists, almost throughout of pale sandstone, generally massive, coarse, and pebbly, but often fine-grained, yielding a good building stone, or flagging. Dark gray calcareous grit and greenish sandstone and shale also occasionally occur. Red shale was noticed in a stream section, half a mile west of Kirlish House, and red sandstone in only one section (Gillygooly burn,) which is quite possibly Lower Carboniferous sandstone, brought up by a branch fault—not indicated here however—similar to that entering the Cool valley; for the red

coloration which characterizes the Lower Carboniferous sandstone may be said to distinguish it also from the present division.*

Very little Drift covers the rock in the N.W. corner of the sheet, and the streams have removed the local debris, so that good sections are numerous, and the character of the rock is to be here best seen.

As might be expected, the massive beds of sandstone form crags, which overlie deposits of calcareous shale. These deposits contain, together with thin grit beds, impure beds of limestone, both earthly and arenaceous, which are frequently magnesian (see subjoined table of analyses,†) though none of them have the characteristic appearance of dolomite; nodular layers of ironstone and thin seams of coal are also of occasional occurrence.

An important deposit of shale with highly fossiliferous shaley limestone is observed in a burn one mile west of Trig station, "990 Ballyness," apparently separating the Lower Limestone from the first grit bed of the middle division.

J. R. K.

North of Ederny the Calp Sandstone enters the sheet; it is a hard, white, highly quartzose sandstone. About 1 mile due N. of Ederny the beds are disturbed by faulting; but it extends towards the E. for about three miles, until the mica schist boundary is reached. Here there is a very good section to be seen, immediately N. of Lack, in the stream; the schists are dipping N. 20° W. at 75°, and resting immediately on them comes a brecciated conglomerate, dipping due W. 30°, then soft red sandstone or conglomerate, with quartzose and schistose pebbles, about the size of pigeon's eggs; then red shales, on which are resting a few beds of hard fine-grained yellow sandstone; then a bed of greenish sandstone, with specks of mica, then rotten red and green shales alternating, also beds of a yellowish-green sandstone, dipping a little S. of W. at 25°.

The basal beds have a very great resemblance to the Lower Carboniferous beds at Victoria Bridge, south of Strabane.

Getting higher up in the strata, the beds dip at a lower angle and are more shaley, with bands of impure limestone. Further west there are several outcrops of fine-grained white quartzose sandstone, showing evidence of faulting.

S. B. W.

Upper Limestone.

A good section of this member is met with in the stream flowing eastward towards West Longfield Church, where the following varieties may be noticed, beginning from below upwards:—Bluish-gray earthy limestone beds, averaging one foot thick, under very

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* I have been informed that the columns at the front entrance of Omagh Courthouse were obtained in a quarry near Kirlish House, N.W. of Drumquin, not now worked.

† See Appendix, p. 29.

dark earthy limestone and blue shale. Beyond the N. and S. fault massive-bedded limestone alternates with shale. On the N. side of Carrickaness bridge the limestone weathers quite shaley, and this variety passes under massive arenaceous limestone on the S. side, where large square pillars are to be observed, 6, 8, and 10 feet in height. They are formed by two sets of joints bearing N.W. and W. 35 S.; and as the sides are still almost vertical, the adjacent rock seems to have been torn away rather than gradually removed.

Blue arenaceous limestones, 1′ to 2′-6″ in thickness, under dark gray and crystalline beds are quarried for lime, &c., in Dunnaree Hill, S. of Drumquin. Massive-bedded fine gray fossiliferous limestone has also been quarried extensively some years since in Drumscra, one mile N. of the last named point.

Representatives of this division occur in the Cool and Glenrone valley. Fine blue thick-bedded limestone, with corals, is quarried on the slope overhanging Cool bridge, overlying Calp sandstone, and brought up against Yoredale sandstone on the west and north-east by faulting. Similar limestone is found westward in Carrick, bedding set at a high angle; and in Curragh glebe on the road side, E. and W. of Curlishog bridge respectively. The latter section is penetrated by a small dyke of basalt; further west, near the Willmount fault, occurs massive light gray compact limestone. It is a portion of this, doubtless, S.E. of the new National school, near where it strikes the Cool and Glenrone fault, which is apparently transformed into dolomite.*

J. R. K.

There is a small area about eight square miles, between Ederny and Parkhill Lough, which is occupied by the Upper Limestone, leaving the sheet N. and S. of Ardess Rectory. It is generally a blue or gray compact, crystalline, fossiliferous limestone, and does not appear to possess the bands and nodules of chert, which is the great characteristic feature in the Upper Limestone south of Lough Erne; but any doubt there might have been at first sight is set at rest by Mr. Symes having traced the connexion between the Lower Limestone, and middle or Calp limestones and sandstones, upon which the Upper Limestone is resting in the adjoining sheet 32, where it is capped by Yoredale sandstone. The dip is low, generally in a S.W. direction. But in the S.E. corner the beds dip at a much higher angle S. at 20°; this is clearly the result of faulting, and caused by a large fault, which throws down the limestone against the conglomerates of the Lower Old Red Sandstone.

S. B. W.

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* Compare with what has already been noticed on page 13. The faults seem to have a distinct connexion with the transformation, as I have observed elsewhere.

Yoredale Beds.

Shale.—Near the top of Dunnaree Hill a line is easily traceable, by springs and in stream cuttings, separating the pale sandstone which crowns the hill from calcareous shale which forms the slopes; and another line, just as easily traceable, along a mile on the N.E. shoulder half-way down the slope, by pot-holes, separates the shale from the underlying limestone. The shale included between these two lines belongs to the "Yoredale series," and is about 300 feet in thickness.

Sandstone, forming the top of Dunnaree Hill, is usually of a pale yellow colour, and massive or flaggy. It closely resembles that of Calp age, so much so that one may travel from Dunnaree, westward to the sheet margin, without recognizing any change in passing from one division to the other, across the Willmount fault, which here cuts out the Upper Limestone and Yoredale Shale. The subsidiary deposits of calcareous shale, however, corresponding to those already noticed as occurring in the Calp, seem to assume a larger proportionate place here, and contain beds of fossiliferous shaley limestone. A good section, showing this feature of the upper Yoredale beds, may be noticed in a stream flowing down the hill westward in Prughlish. J. R. K.

Igneous Rocks.

Felstone.—Three areas of igneous rock are indicated as felstone in the N. half of this sheet. An opening has been made at Farm Hill, near the east margin, for road-metal, on purplish felstone, usually compact, and containing as accessory a copper-coloured mineral (augite ?) similar to that found at Recarson, and described by Mr. Nolan in the memoir accompanying Sheet 34. The rock is also in parts vesicular, as is well seen in Crannyburn, S.E. of Farm Hill.

At the S. end of the Railway cutting, displaying the section of metamorphic rock, near Omagh, a mass of felstone is to be seen, resembling that occurring at Farm Hill, including the copper-coloured mineral (*). This mass seems to be connected with the felstone and felspathic ash, seen on the roadside about half a mile west of the Railway cutting.

A third outcrop west of Clanabogan is observed in a stream where the latter is crossed by the S. branch of the pre-Carboniferous fault. A small thickness of slate-coloured vesicular felstone overlies argillaceous grit, a bed of pink translucent felsite intervening between them. The fault between this and the purple shale on the opposite side of the road, doubtless cuts out a certain thickness of felstone, as noticed in describing the Lower Old Red Sandstone ("Dingle beds.")

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* Mr. Nolan (memoir of Sheet 34) treats his Recarson rock as melaphyre, in virtue of its containing augite. This mineral is quite accessory at Farm Hill, by no means occurring in so important a degree as to warrant a change of name and colour; for the rock, but for the presence of the augite, would be unquestionably a felstone.

As to the association of augite with orthoclase, see Microscopic Notes by Prof. E. Hull, F.R.S., in Explanatory Memoir of Sheets 76 and 77.

There is no proof that any one of these three areas has been the seat of volcanic action, though it is obvious that the outbursts represented in the first two instances are contemporaneous, since conglomerates, &c., made up wholly of felstone debris, are immediately connected with each, which is probable also in the last instance.

Dolerite.—Several dykes have been noticed in the district, nearly all of which run in a north-westerly direction. One, of dark greenish gray dolerite, crosses Cornavarrow burn E. of Dooish Valley. It is probably the same which reappears further east in the burn separating Cornavarrow from Corrasheskin, where it is thirty-eight feet in width; and again, westward, in Dooish, where a dyke of about the same width is traceable at intervals (for its course is interrupted) along the north-east and north slopes of the hill, in a waved direction, towards Glenrone bridge. Here it seems to be represented on the N. side of the great fracture by a dyke running in the same general direction, and of the same character and approximate width. Throughout its entire length, as thus described, large crystals of a greenish translucent mineral (probably olivine) are of common occurrence. A similar dyke, ten yards wide, crosses Dunnaree Hill; and another, thirteen feet wide, crosses Carrickaness burn, below the bridge, running north-westward, and consisting of dark greenish dolerite, which is in parts vesicular, and contains olivine.

The remaining dykes do not demand any special notice. One of these may be seen penetrating the "Bin rocks," near the N. margin of the sheet. J. R. K.

A large dyke of dolerite enters the sheet S. of Irvinestown railway station, crosses the railway cutting W. of the Railway bridge, runs in a N.W. direction under the Church, and, passing the Union workhouse, is well seen in a quarry to the W. of the main building, where it is lost for a time under the Drift, appearing again on the Irvinestown and Kesh road, 1½ miles from Irvinestown, where a small portion is exposed.

This dyke, which is about 50 yards wide, is a dark greenish, crystalline, granular rock, weathering into nodules, which peel off under blows from a hammer, the surface being of a rusty brown colour; it appears to contain crystals of a dark olive-green mineral. In the townland of Glennan, about one mile N. of Cavan House, there is a small outcrop of a compact dark greenish blue basalt; and about 2½ miles E. in the river, S. of Riverland Glebe House, a similar, possibly the same, dyke is just perceptible, where the drift and alluvial deposits join.

In the stream which is the boundary between the townlands of Mweelbane and Stranadarriff, N.W. of the village of Lack, there is a small dyke of a similar rock.

S. B. W.

Drift Deposits, &c.

Boulder Clay.—It has been already stated that the high ground in the N.W. corner of the sheet is almost wholly devoid of Drift. At Willmount, however, blue clay, with scratched blocks of sandstone and limestone, ascends to the 700 feet contour line. The low ground about Drumquin, stretching eastward by Claraghmore, is studded with drift hillocks of irregular shapes, as is also the case along the Omagh valley. At Omagh, a cutting in the hill on which the new barracks stand showed tough brown gravelly clay, with scratched blocks of greenish grey and light brown grits, some also of limestone, and fragments of schist and white quartz. A stream forming the west boundary of Aghadulla, W. of Clanabogan, exposes a section of gray boulder clay, with subangular and rounded blocks of mica schist, also a few blocks of pale and red sandstone. Near Omagh, N.E. of Clanabogan, in the bank of Cavancaw burn, is to be seen stiff clay, with glaciated grit-blocks, schist-pebbles, and white quartz fragments. Upon this rests rudely stratified purple clay, with large scratched blocks, which in turn underlies alluvial deposits of schist debris.

The drift overlying the Old Red Sandstone S. of Omagh is shallow, and seems to be almost wholly derived from the formation upon which it rests. J. R. K.

The boulder clay is distributed evenly over the southern portion of the sheet; it generally takes the form of hog-backed hills, often surrounded by alluvial flats or peat-bog. Schist, dolerite, rather angular blocks of red sandstone, with a few well rounded blocks of limestone (the latter generally well scratched,) compose the boulders, while the matrix is generally a tough reddish clay, sometimes becoming mottled—reddish, blue, and green.

South of Fintona the Drift changes altogether, and between Fair View and the Rectory, it is entirely formed of well rounded pebbles, sometimes stratified, of quartz, schist, and quartzite.

This Drift is local, it being evidently the result of the denudation of the higher lands immediately to the south, which are occupied by quartzose conglomerates.

Amongst the Drift deposits of the S. W. corner of the sheet, bright red jasper boulders are met with. S. B. W.

Old River Gravels and Alluvium—Two small areas of Old River Gravels are indicated at Omagh. A section upon one of these is laid open at "Campsie (old) Bridge," where the gravels attain a level of about sixteen or eighteen feet above the present alluvium, and a section on the second area is to be observed in the river bank at Lisanelly.

An area of Old River Alluvium is also to be observed at Mount Pleasant, two miles N.W. of Omagh.

Peat (bog) and Alluvium.—Large proportionate areas, of the Dooish range and the hilly tract in the N.W. corner, are covered by mountain bog. The peaty flat, through which the Fairy

Water flows, extends from Claraghmore escarpment, nearly three miles northward, a considerable area of which lies within the north margin of this sheet. The Strule river alluvium is continuous from Doogary northward to the sheet margin, and is joined at Poe bridge by the flats of the Fairy Water. The wide entrance to the Dooish valley is occupied by an extensive peaty tract, and from it an elongated alluvial flat stretches more than half the length of the valley northward, along the tributary of the Drumquin river, which drains the valley, taking its rise in the above tract. J. R. K.

South of Tappagan mountain, the hill slope is covered by a considerable thickness of mountain bog, which is here of considerable extent.

South of Lack there is a patch of mountain bog of great thickness, but on the hill-top it only occupies a small area.

All the other alluvial deposits and peat bogs are met with in the low-lying lands, as a rule surrounding the hills formed by the boulder clay. There is a just perceptible N.E. and S.W. trend, both of the alluvial flats and the drift hills. S. B. W.

Faults, &c.

The faulting N. and S. of the Dooish range has already been noticed. That the break on the south side is of considerable magnitude is evident from the prevailing westward dip over an extended area of upturned Lower Old Red Sandstone strata ("Dingle beds.") Moreover, a corresponding thickness of this formation has been denuded on the north side of the fault; and this, even prior to the deposition of the Carboniferous strata, which repose directly on the schists, where the basal beds of the latter formation are seen—affording marked evidence for the unconformability of the two formations. The faulting here is, therefore, of pre-Carboniferous date, and equally evident is it that the break by Gillygooly, on the north side of the range, is post-Carboniferous. Here then are two systems of faulting, of different ages, with contrary throws, yet running in the same general direction, and not far apart; indeed, as is afterwards noticed, they seem to touch at two points at least.

The great post-Carboniferous fault has been traced from Bunnynubber, N. of Omagh, passing beneath the Strule river alluvium, and by Gillygooly, W. by S. towards Drumquin. In the Cool and Glenrone valley, S.W. of that town, the faulting is complicated, and not easily traceable, though available sections are numerous, since scarcely sufficient variety exists amongst the rocks seen there, to admit of an unquestionable determination of their stratigraphical position in the Carboniferous series.

The prevailing, though not exclusive, red colour of the beds in the narrow wedge-shaped tract between the faults, entering the valley from the east, has been taken to prove its Lower Carboniferous age.

Further west, the pale or buff-coloured sandstone, forming the bottom and north side of the valley at intervals, may be of the age of either the Calp or Yoredale beds, so far as lithological evidence goes to show. Other considerations connected with the faulting, however, seem to justify the conclusions set forth on the map.

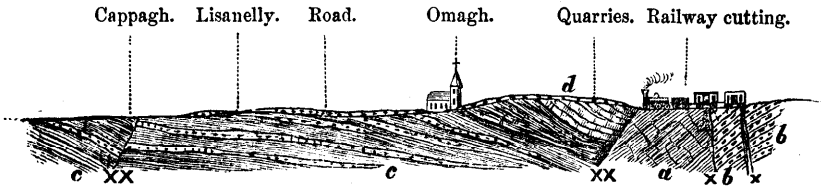
The fault crossing Dunnaree hill, having entered the sheet from the north, and the more important one by Willmount, both running southward to join the great Glenrone break at different points, are established by an evident displacement of boundaries. That running parallel to these last, southward by Carricknamadew, through Killen gap, is similarly established; but, as its course coincides with that of a stream flowing through the gap, the beds are seen at several points to be smashed and set at a high angle. A branch from this fault runs N. by E. by "the Bin rocks," cutting out several beds belonging to the Lower Limestone; and a third break runs between the two last mentioned, which is to be seen crossing the Drummahon burn, where the beds are thereby strikingly displaced. The small fault crossing Crockalaghta is visible in a good section between the two roads on the N.W. side of that hill, just before they join, northwards.

In the bed of a mountain stream, just before it enters the alluvium S.W. of East Longfield Glebe House, red Carboniferous beds are brought down against the schists by a fault traceable southward across this burn, higher up; further south, the fault crosses a second burn, winding south-westward into the valley. A branch from this fault runs W. by S. beneath a small alluvial tract, and forms the boundary between the Carboniferous beds striking S.E. and the metamorphic rocks, though leaving on its south side a breccia-bed of the newer formation, resting on its parent schist. A third break between those first described is to be seen crossing the burn above the small alluvial tract last mentioned.

The principal difficulty in mapping this faulted district has been experienced in the country immediately around Omagh, where at least half a dozen varieties of rock occur within a space of as many square miles, and of three different ages—all included between the two great lines of dislocation above described, and between the two metamorphic areas of the Dooish and Mullaghcarn groups. Being situated thus in the valley, which is much obscured by drift, important conclusions have had to be drawn from very sparse data;—satisfactory openings on the rock being exceedingly rare.

Perhaps the most striking point to be noticed on entering the locality is the occurrence of pure Carboniferous limestone S. of Omagh, *striking at* or *dipping towards* a section of metamorphic rock, which itself has the appearance of overlying the Old Red Sandstone strata still further south. The former point is to be observed in crossing the main road from Omagh to Dromore, at the Railway bridge, from the quarries to the railway cutting, where the metamorphic rock is best seen. There is here then, evidently, a downthrow to the north, cutting out the whole of the Lower Carboniferous division (sandstone and shale) and an uncertain thickness of Lower Limestone.

Section 3.—North and South, through Omagh Quarries.



References: *a.* Metamorphic rock; *b.* O. R. Sandstone overlain by felstone; *c.* Lower Carboniferous Shale and Sandstone; *d.* Lower Limestone; x, pre-Carboniferous faults; xx, post-Carboniferous faults.

Another point on the same break is also to be met with in the townland of Mullaghmore, in a small wooded glen, near which beds of Carboniferous grit and shale are seen in the burn dipping *towards* the fault; the fault separating that formation from the small metamorphic area E. of Omagh.

South-west from the Chase Farm, ("Mountjoy Forest,") near the N. margin, runs another fault, bringing Lower Carboniferous beds of different horizons into juxtaposition with the schists. Near Lisanelly House beds of Lower Carboniferous shale are tilted up at a considerable angle, which may indicate a point on this line in its southward course. In a deep section in the road to Gillygooley, W. of Omagh, a great accumulation of angular blocks of pale sandstone is seen by the roadside; the bedding is also much disturbed and smashed in a section nearly one mile further west. Both these seem to indicate the position and continuation of the above line of fault towards the metamorphic ground. There are then three lines of fracture traceable, having downthrows to the north, all clearly belonging to the newer system of faults.

The magnitude of the Mullaghmore fault S. of Omagh necessitates an inquiry as to its continuation westward, and this is met by the fact that sandstone beds overlying, so far as can be ascertained, the outcrop of limestone W. of the town, and therefore concluded to be Calp, are brought against the mass of schists which form the eastern portion of the Dooish range. It is presumed, therefore, though the ground is particularly obscured by drift hereabouts, that the continuation of the above-named fault passes north-westward to join the equally important break at Gillygooly, meeting on its passage the fault running S.W. by Lisanelly. A branch from the Lisanelly fault running due south accounts for such a displacement of the Lower Limestone, as is indicated on the map, from such evidence as the locality affords. It may be added that the surface features along this line quite sustain the supposition of a fault here.

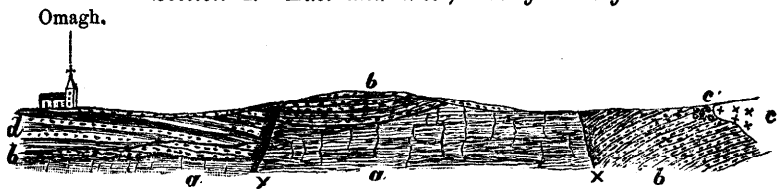
Returning now to the schist sections in the railway cutting S. of Omagh, the metamorphic rock *apparently overlies* felstone of undoubted Old Red Sandstone age (consult Section 3,) proving the existence of a fault with downthrow to the south. This seems to be the main break of the older system of faults, although a short distance south of this point occurs a second fault, doubtless joining that first referred to, E. and W., and more directly in the W. by S. line. Evidence of a fracture in this position is found near dip "20" in a section on the road side, half-way

between Omagh and Clanabogan, and it is considered that the felstone almost exclusively occupies the enclosed space.

W. of Clanabogan, this fault bifurcates, the S. branch bringing a small patch of interbedded felstone against beds lower down in the series. The main branch waves slightly to the north, and, further west, becomes strikingly varied in its course; conclusive evidence establishing the existence, and, within narrow limits, the position of the various lines by which the fault is continued westward to Greenan. One of these lines is traceable north-eastward by Tattykeel to Gillygooly burn, beyond which it may join the post-Carboniferous fault; similarly a second line seems to run southward through the valley E. of Dooish to meet the older break, having first received the lowest Carboniferous beds dipping south-westward against metamorphic rock, and entered the alluvium, where it would be joined doubtless by another branch of the post-Carboniferous fault.

The continuation of the older break eastward is found in one running N.E., which is observed in Cranny, where, in the burn, "Dingle beds" dip at a high angle towards the small metamorphic area.

Section 4.—East and West, through Omagh.



References: *a*. Metamorphic rock; *b*. O. R. Sandstone; *c*. Felstone and derived conglomerate; *d*. Lower Carboniferous beds; x, x, Faults.

This fault probably extends southward towards the "Bloody Bridge," near to which a small section shows evidence of faulting in the immediate neighbourhood.

At two points, therefore, the post-Carboniferous fault by Mullaghmore seems to coincide with the older break, where there also may be a reversal of throw, to some extent at least.

A certain measure of interest attaches to the Lower Old Red Sandstone area, S.E. of Omagh. It evidently passes beyond the Mullaghmore line of fault, beneath the Carboniferous strata, probably as far as, if not further northward than, the town. (Compare Section 4.) Being then a remnant left after the general denudation which exposed the metamorphic rocks, N. of the older line, and being still at a lower actual level than the high grounds rising up on either side of Omagh, after exposure to the waste of ages, we have here surviving evidence for the pre-Devonian age of the valley. Had denudation perchance removed this, at best, but shallow representative of the formation, and exposed the rock connecting the small metamorphic areas S. and E. of Omagh, the facts as to the valley would remain; though no obtainable evidence of its age would carry us further back than the epoch immediately preceding the Carboniferous period.

J. R. K.

A fault, previously mentioned, enters the sheet N. of Irvinestown, a little north of White Lough, and runs in a N.E. direction by Black Lough and Raw Lough, almost through Doocrock Lough, until eventually lost in alluvial land and drift hills S. of Dullaghan Bridge. It is certainly in connexion with the faulting S.W. of Omagh, and is possibly the continuation of "the main branch" of the fault mentioned by Mr. Kilroe as running S.W. of Clanabogan, and "bifurcating." p. 23.

The lower beds to the S. of the line of break, dip at a very low angle, but immediately N. of it the beds become very much disturbed, in fact nearly vertical.

The boundary between the three different rocks—viz., Upper Limestone, Calp beds, and Metamorphic rocks on the one hand, and the Dingle beds on the other, is also a line of fault, and is in connexion with the large faults mentioned by Mr. Kilroe. It traverses the central portion of the sheet at the Holm, travelling S.W. leaves the sheet on the W., where it forms the boundary between the Upper Limestone and Dingle beds, and apparently cutting out the Calp beds entirely.

N. of Ederny the Upper Limestone is apparently faulted down through the Calp beds; there is not much clear evidence owing to large tracts of bog and alluvium. S. B. W.

PALÆONTOLOGICAL NOTES—SHEET 33.
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.
		County of TYRONE.	
1	33/1	Killoan, . . .	Rocks in stream three miles west-north-west of Drumquin, three-quarters of a mile east-north-east of Willmount National School; dark gray limestone. "Upper Limestone" on Map.
2	33/1	Drumcwen, . .	Bank of stream, a quarter of a mile north-east of Lackagh National School, two and three-quarter miles west-south-west of Drumquin; gray earthy shales. "Upper Limestone" on Map.
3	33/2	Carrickanass, . .	Rocks in Blackwater River, half-a-mile east of Carrickaness Bridge, and one and a half miles west of Drumquin; dark gray compact limestone. "Upper Limestone" on Map.
4	33/2	Billary, . . .	Quarter of a mile north-west of Carrickaness Bridge, two miles west of Drumquin; dark gray limestone. "Upper Limestone" on Map.
5	33/2	Barravey, . .	Quarry on road, one mile north of Carrickaness Bridge, two miles north-west of Drumquin; dark gray limestone. "Upper Limestone" on Map.
6	33/3	Prughlish, . .	Quarry west side of road from Curlishog Bridge to Drumquin, three miles south-west of Drumquin; gray micaceous sandstone. "Yoredale Sandstone" on Map.
7	33/3	Do., . . .	Rocks in stream, a little west of bye road, half-a-mile west of road from Carlishog, about half-a-mile north-west of preceding locality; dark gray earthy limestone. "Yoredale Sandstone" on Map.

PALÆONTOLOGICAL NOTES.—LOCALITIES from which FOSSILS were collected—*continued.*

No. of Locality.	Quarter Sheet of 6-inch Map.	County and Townland.	Situation, Geological Formation, and Sheet of 1-inch Map.
		Co. of TYRONE—*con.*	
8	33/3	Carrick, . . .	Quarry about a quarter of a mile east of Carlishog Bridge, three miles and three-quarters south-west of Drumquin; gray compact limestone. "Upper Limestone" on Map.
9	33/3	Curragh Glebe, .	Quarry on road to Ederny from Drumquin, a little south-west of Carlishog Bridge, a little west of preceding locality; gray compact limestone. "Upper Limestone" on Map.
10	33/4	Drumacra, . .	Half-a-mile west of Longfield R. C. Chapel, one mile south-west of Drumquin; dark gray compact limestone. "Upper Limestone" on Map.
11	33/4	Dunnaree, . .	Rocks on old road, Dunnaree Hill, one and a half miles south-west of Drumquin; dark gray micaceous shales. "Yoredale Shales" on Map.
12	33/4	Dooish, . . .	Rocks in stream, half-a-mile south-west of Longfield R. C. Chapel, one and a half miles south-west of Drumquin; dark gray earthy limestone. "Upper Limestone" on Map.
13	33/4	Coolavan, . .	Rocks in stream running through plantation one mile west of Dooish National School three-quarters of a mile west of preceding locality; dark gray earthy limestone and shale. "Upper Limestone" on Map.
14	35/1	Lisanelly, . .	Rocks in Camowen River, three-quarters of a mile north-west of Omagh; dark gray micaceous shales. "Lower Carboniferous Shale" on Map.
15	35/3	Culmore, . .	Quarry at Dromore crossing, Londonderry and Enniskillen Railway, half-a-mile south of Omagh Station; dark gray compact limestone. "Lower Limestone" on Map.
		Co. of FERMANAGH.	
16	2/3	Tirmacspard, . .	Rocks in stream on boundary of counties Fermanagh and Tyrone, a little east of road from Ederny to Drumquin; dark gray compact limestone. "Upper Limestone" on Map.
17	2/3	Do., . . .	Rocks in same stream, about a quarter of a mile north-west of bridge on road from Drumquin to Ederny, half a mile north-west of preceding locality; compact gray limestone. "Middle Limestone" on Map.
18	2/3	Do., . . .	Quarry close to corn kiln, east of road from Ederny to Drumquin, three miles north-east of Ederny, half-a-mile south-west of locality 16; dark gray compact limestone. "Upper Limestone" on Map.
19	2/3	Corlaght, east, .	Rocks in stream, a quarter of a mile south of Loughavigh, three and a half miles north of Ederny, half-a-mile west-north-west of locality 17; micaceous buff-coloured sandstone. "Calp or Middle Limestone" on Map.
20	2/3	Drumhirk, . .	Rocks in stream, a quarter of a mile south of Gushedy National School, three miles north of Ederny; dark reddish gray limestone and shale. "Middle Limestone" on Map.

PALÆONTOLOGICAL NOTES.—LOCALITIES from which FOSSILS were collected.—*continued.*

No. of Locality.	Quarter Sheet of 6-inch Map.	County and Townland.	Situation, Geological Formation, and Sheet of 1-inch Map.
		Co. of FERMANAGH—*continued.*	
21	6/1	Boundary of Drumierna and Ghill.	Quarry on road one mile north of Ederny; dark bluish gray limestone. "Upper Limestone" on Map.
22	6/1	Drumboarty, . .	Quarry a quarter of a mile north of "Ancient Camp," one and a-half miles north of Ederny; gray micaceous sandy shales. "Calp or Middle Limestone" on Map.
23	6/3	Tullanaglug, . .	Quarry west side of road from Irvinestown to Ederny, half-a-mile south-east of Ardess Church, two miles south-west of Ederny; dark reddish gray compact limestone. "Upper Limestone" on Map.

LIST of 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 LIMESTONE, SANDSTONE, AND SHALE.

	Localities.
PLANTÆ	
Equisetites dubius (Brongniart), . . .	14.
„ sp. indet., ...	10.
Filicites linearis, ...	22.
Lepidodendron selaginoides, ...	22.
Sagenaria Veltheimiana?	19.
Stigmaria ficoides, roots of Sigillaria, . . .	17.
Plant stems, &c., ...	6, 14, 19, 22.
„ ?	10.
ACTINOZOA: *Zoantharia.*	
Alveolites sp. indet, ...	14.
Chætetes tumidus, ...	1, 2, 20.
Cyathophyllum, sp. indet., ...	11.
Lithodendron affinis, ...	1, 2, 3, 4, 5, 7, 20, 23.
„ irregularis, ...	12.
Michelinea favosa, ...	3, 5, 9.
Syringopora geniculata, ...	1, 2, 3, 5, 12, 23.
Zaphrentis cylindrica, ...	5, 12.
MOLLUSCA: *Polyzoa.*	
Fenestella antiqua, ...	1, 2, 10.
„ tenuifila, ...	2.
Sulcoretepora parallela, ...	2.
Brachiopoda.	
Athyris planosulcata, ...	2, 8, 13, 20.
Orthis Michelini, ...	2.
„ resupinata, ...	7, 12, 16, 23.
Productus fimbriatus, ...	10, × 15.
„ giganteus, ...	1, 2, 5, × 7, 8, 9, × × 10, 15, 16, × × 21.
„ punctatus	2, 3, 11, 21.

	Localities.
Brachiopoda—continued.	
Productus scabriculus,	5, 9, 10, 11, 13, × × 15, 16, 21.
„ semireticulatus,	1, 2, 7, 10, 11, 18, 20, 23.
Lingula squamiformis,	11.
Rhynchonella pleurodon,	1, 4, 8, 9, 10, 18, 21.
Spirifera laminosa,	2.
„ striata,	2, 8, 11, 16, 18.
Streptorhynchus crenistria,	1, 2, 3, 9, 10, 11, 13, 23.
Terebratula nastata,	2.
Lamellibranchiata.	
Avicula laminosa,	20.
Aviculopecten granosus,	20.
„ Sowerbii,	7, 9.
Dolabra securiformis,	2.
Edmondia sulcata,	2, 7.
Leda leirorhynchus,	11.
Modiola Macadami,	× × × 14, 20.
Myacites primæva,	2, 5.
Pleurorhynchus minax,	2.
Pullastra scalaris,	11.
Sanguinolites plicatus,	13.
„ transversus,	11.
Solen pelagicus,	9.
Gasteropoda.	
Euomphalus pileopsideus,	9, ? 17.
„ sp. indet.,	13.
Turritella spiralis,	2.
Small bivalve and univalve shells,	8, 9, 17.
Heteropoda.	
Bellerophon, sp. indet.,	23.
Cephalopoda.	
Nautilus sulcatus,	14.
Orthoceras, sp. indet.,	10, 13, 14.
ECHINODERMATA: *Crinoidea.*	
Actinocrinus lævis,	11.
Crinoid fragments,	1, 8, 12, 13, 16, 21, 23.
Echinoidea.	
Archæocidaris Urii,	11.
CRUSTACEA: *Ostracoda.*	
Leperditia Okeni,	2, 7, 8, 14, 17.
„ (Cypridella orbicularis M'Coy, var. Scoto-Burdigalensis,	18.
PISCES.	
Helodus planus,	4.

REMARKS ON THE FOSSILS.

The collection of fossils from this district, which present some important features, was made by Mr. Richard Clark; I had not myself an opportunity of visiting that part of the country.

Plant remains occur at six localities, including reed-like fragments at locality No. 6 in what is described on the map as "Yoredale Sandstone." At No. 10 are plants associated with fossil shells, including a jointed

stem referred to *Equisetites*, and another to *Sagenaria*, the strata at this place being described as "Upper Limestone." At No. 14 the plant remains are associated with characteristic Lower Carboniferous fossils, *Modiola Macadami*, and *Leperditia Okeni*. At No. 17 *Stigmaria ficoides*, characteristic of coal measures, was collected from gray micaceous sandstone, described as "Calp or Middle Limestone." At No. 19 plant remains in buff coloured micaceous sandstone includes a branching plant doubtfully referred to *Sagenaria Veltheimiana;* the strata here is described as Calp or Middle Limestone, but if this identification be correct, it would be more properly designated as Lower Carboniferous Sandstone, which it lithologically also very much resembles. At locality No. 22, branching plant stems, strongly resembling those I have named *Filicites linearis*, of the Lower Carboniferous slate, and a very broad stem (two inches in diameter), in appearance also resembling those of the Lower Carboniferous slate, together with another referred to *Lepidodendron selaginoides*, were the only fossils collected.

The other fossils exhibit the ordinary features and do not require special mention; Corals, Brachiopods, and Lamellibranchs, or ordinary bivalves (the latter being more numerous in the number of genera and species than usual) were the prevailing classes represented. Locality No. 7 is described as being situated on Yoredale Sandstone, whilst it is evidently Carboniferous Limestone, most probably Lower. At locality No. 13, the fossils and matrix are more like Lower than Upper Limestone, as described on the map, and those of locality No. 22, are most probably from Lower Limestone shale.

WILLIAM HELLIER BAILY.

December 8th, 1884.

APPENDIX.

Note on Magnesian Limestones (referred to on p. 13).

Twenty limestone specimens suspected of being magnesian were analysed by Mr. Kilroe at the Laboratory of the Royal College of Science—

Four were from the Lower Limestone Division.
Eight from beds in the "Calp" series.
Five from the Upper Limestone, and
Three from the Yoredale shale.

Of the first four, one from Drummahon proved to be brown crystalline normal dolomite (see p. 13); the remaining three showed traces of magnesia.

Of the five from the Upper Limestone, two showed traces of magnesia, two (from Dunnaree Hill) an estimable quantity, though small, and another (from Billary) the same.

Of the last three (found in Prughlish) only one proved to be decidedly magnesian.

Of the eight specimens taken from the Calp three showed traces, two an estimable quantity; and the following table of approximate analyses gives the composition of each of the remaining three:—

Table of Approximate Analyses.

Locality.	Meenbog, No. 1.	Far Scraghy.	Meenbog, No. 2.	Remarks.
Lime,	19·63·	20·28	22·0	None of these showed distinct dolomitic indications, though the composition of each approximates to that of dolomite.
Magnesia,	13·04	12·60	12·98	
Carbonic Acid,	33·00	32·39	29·2	
Hydro-Sulp. Acid,	—	trace		
Ferrous Oxide,	3 7	4·21		
Insoluble Residue, containing Ferric Oxide, Silica, and Alumina.	30·63·	30·52	35 82·	
Total,	100·00	100·00	100·00	

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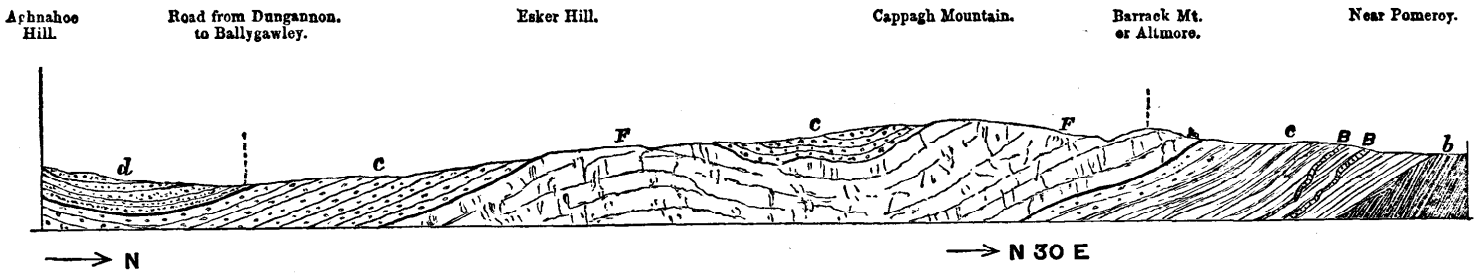
Fig. 1.—*Section from the Lr. Carboniferous Rocks on the south to the Silurian Rocks at Pomeroy.*



b. Silurian rocks. *c*. Old Red Sandstone and Conglomerate. F. Contemporaneous Felstone. *d*. Lower Carboniferous Sandstone and Conglomerate. B. Basalt Dykes.

Scale, 1 inch to 1 mile horizontal—3 inches to 1 mile vertical.