EXPLANATIONS

TO ACCOMPANY

SHEET 162 OF THE MAPS

OF THE

GEOLOGICAL SURVEY OF IRELAND,

ILLUSTRATING PART OF

THE COUNTY OF KERRY.

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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 at 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, or in preparation.

Condensed memoirs on particular districts will also eventually appear.

EXPLANATIONS

TO ACCOMPANY SHEET 162, OF THE MAP

OF THE

GEOLOGICAL SURVEY OF IRELAND.

General Description.

1. *Form of the Ground.*

This sheet of the map includes a part of the county Kerry, round the towns of Tralee (the county town), and Castleisland. The most remarkable features of the district are, the eastern extremity of the Slieve-Mish range of mountains, which occupies the S.W. corner and the range forming Stack's and the Glanruddery mountains at the N. and N.E. side of the map. Between the former and the latter lies the valley in which are situated the above-mentioned towns.

The Slieve-Mish mountains, S. of Tralee, are about five miles broad from N. to S., but become narrower as they sink towards the east, till they are not more than one mile in width.

The highest point of the portion of Slieve-Mish seen on this map is Glanbrack mountain, which is 2,169 feet above the level of the sea, and is at the western edge of the sheet. The northern slope of this range is rather steep: the ground descending in a horizontal distance of two miles and a-half from 2,169 feet to the sea-level at Tralee Bay. The southern slope is more gradual, requiring nearly four miles to attain the same level at Castlemaine Harbour, in sheet 173.

The crest of the range slopes gently eastwards from Glanbrack mountain, and at a distance of ten miles is lost in the plain west of the village of Currans at an elevation of about 100 feet above the sea.

The highest point of Stack's mountains is Ballincollig Hill, 1,170 feet. That of the Glanruddery mountains, Knight's Mountain, 1,097; several other points attain an elevation of upwards of 1,000 feet. They are not a regular range like Slieve-Mish, but form an undulating table-land, stretching away to the north, and intersected by glens and ravines, the general directions of which are east and west. The Glanruddery are separated from Stacks mountains by the narrow valley of the River Smearlagh, which rising a little N.W. of Knight's Mountain, flows in a northerly direction.

On their southern slope these mountains decline from 1,097 to about 160 feet in a horizontal distance of two miles. The N.W. slope of Stacks mountains is very gradual, as they extend to a distance of six miles N. and N.W. of Ballincollig Hill, before they merge into the plain, at an elevation of about 100 feet.

The valley of Tralee, between the Slieve-Mish range and the hills to the northward, averages in breadth about two miles and a-half; and the lowland N.W. of Tralee, after curving round the western end of Stacks mountain, which forms as it were a promontory in the plain, stretches away northwards and widens out into the plain

of Listowel, in sheet 151. West of Currans, where the Slieve-Mish mountains have sunk into the valley, the breadth of the latter from N. to S. is six miles. Towards Castleisland it becomes gradually narrower, and terminates four miles east of that village (in sheet 163) in a space about a mile broad, surrounded by an escarpment of about 400 feet in height.

The mean elevation of the valley of Tralee and Castleisland is about 150 feet. But east of the latter place where it becomes very undulating the ground attains in some places an elevation of 250 feet above the level of the sea. The western side of the valley is drained by the little River Lee, which flows into Tralee Bay; the eastern by the River Maine and its tributaries, which flows into Castlemain Harbour.

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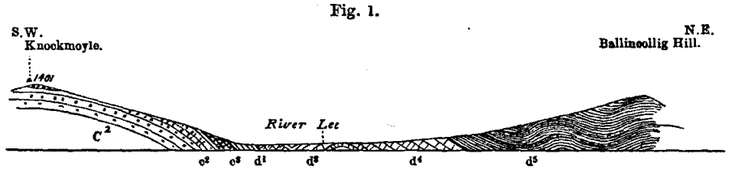
2. *Relations between the Form of the Ground and its Geological Structure.*

In the relations between the external form of the ground and its internal structure the northern and southern parts of this district differ materially. The valley and lowlands everywhere have limestone for their subjacent rock. The high lands on the south side of the map consist of red sandstones, conglomerates, and slates, belonging to the formation called Old Red sandstone; while those on the north of it are composed of black and gray shales and olive-coloured sandstones, forming a part of the Coal Measure series. Now, the red rocks underlie the limestone, whereas the shales and olive sandstones overlie it (see section, fig. 1).

Fig. 1.



Diagrammatic Section across the Tralee Valley.
Horizontal scale, 2 miles to 1 inch. Vertical scale, 2 miles to 3 inches.

d^5 Coal Measures.
d^2 & d^4 Limestone.
d^1 Lower Limestone shale.
c^3 Upper Old Red do.
c^2 Old Red sandstone.

The form of the ground here, as elsewhere, depends on the action of two forces: one of elevation, acting from below, lifting the rocks from their original horizontal position as subaqueous beds; the other of denudation, acting from above, eating into and removing large portions of them while they were being elevated, or afterwards. The force of elevation acted with greatest local intensity under Slieve-Mish range, along a line running E. and W., forming the axis of that range, since it is over that line that the lowest beds rise to the greatest elevation above the sea and decline from it on either hand.

A line about which beds of rock are thus arranged is called an anticlinal line or axis.

The anticlinal axis of Slieve-Mish is not a horizontal one, but rises gently towards the west and declines towards the east, so that in the former direction, lower and lower beds rise up across it to the surface, while in the latter higher and higher beds fold over it till near Castleisland it is covered by the upper beds of the Limestone, and further east (in the next sheet), by the Coal Measures.

When the elevatory forces commenced to act the whole district was, doubtless, a horizontal plain of Coal Measures, underneath which lay the Limestone beds and the beds of Red sandstone, &c., likewise horizontal. It is most probable, too, that the Coal Measures themselves were beneath the water. When the beds of Coal Measures, which then stretched horizontally over the part where is now the Slieve-Mish range, were slightly bent, and tilted, and lifted up within the reach of the action of the waves and currents, parts of them would be destroyed and removed by that action. This would go on simultaneously with the action of elevation, so that the greatest amount of denudation has taken place over the very axis of elevation, and the greatest quantity of matter been removed therefrom, although the rocks that have been left there still rise to the greatest height above the sea.

Although we may assume as most probable that the two forces commenced their action on the district in the region of the Slieve-Mish anticlinal, yet it is obvious that the whole country eventually partook of this action, and the shape of the ground is everywhere owing to the mutual influence of the two forces according as one or the other predominated, or both exerted their agency, and to a certain extent counteracted each other. In the valley of Tralee and Castleisland denudation has proceeded to a greater extent than it has in the region to the north of it, while it has not been counteracted so much as it has in that to the south. The Coal Measures and more or less of the Limestone have been swept away from one part to produce the valley, while they have been left, on the one hand, more or less untouched to form the Stacks and Glanrudderry hills; and though, on the other hand, a still greater amount of denudation has been caused, yet there are nevertheless hills, those of Slieve-Mish, in consequence of the uplifting of the lower beds of Old Red sandstone to so great an elevation.

J. Beete Jukes and F. J. Foot.

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3. *Geological Formations.*

The rocks comprising this district may be grouped as follows:—

	Name.	Colour on Map.
	Alluvium, Bog, &c,	*Pale Sepia.*
	Drift (Limestone Gravel).	*Engraved Dots.*
Carboniferous.	d^5 Coal Measures.	*Indian ink.*
	d^4 Upper Limestone.	*Prussian blue (dark).*
	d^2 Lower Limestone.	*Prussian blue (light).*
	d^1 Lower Limestone Shale.	*Prussian blue and Indian ink.*
Old Red Sandstone.	c^3 Upper Old Red Sandstone.	*Indian red (dark).*
	c^2 Old Red Sandstone.	*Indian red (light).*

The Old Red Sandstone consists of a series of red rocks, arenaceous and argillaceous, with some large beds of conglomerates. In

the upper part the red beds pass into and frequently alternate with others of a yellow or greenish gray *colour*.

c^2. *The Old Red Sandstone* is the lowest rock seen in this sheet. Its basal bed, which is a remarkable conglomerate resting on the upturned edges of the Silurian rocks, is not seen on this map, but appears in that to the west, in the explanation of which it will be described.

The lowest beds seen here are Red sandstones obliquely laminated, and about 200 or 300 feet in thickness. Above them is a conglomerate consisting of rounded pebbles (some of them of considerable size), of quartz, jasper, and hornstone, cemented together in a base of red sand. This conglomerate varies considerably in thickness. Above the conglomerate are more red sandstones and red slates, with occasional calcareous beds or cornstones, generally very much decomposed. These sandstones and slates pass upwards into the beds of the Upper Old Red.

The thickness of as much of the Old Red sandstone, as is seen on this map, may be about 1,300 feet.

c^3. *The Upper Old Red Sandstone* generally consists of light-greenish gray sandstones and yellowish or pale-green shales and sometimes red slates.

The boundary between c^2 and c^3 is extremely arbitrary, having been generally drawn a little below the lowest of the yellow-coloured beds.

The thickness of the Upper Old Red may be about 600 feet.

The Carboniferous Rocks are divisible into two principal groups: the Carboniferous Limestone below and Coal Measures above.

The Carboniferous Limestone is divisible into three groups—the boundary of two of them, viz., the upper and lower limestone being entirely arbitrary, on account of the middle limestone or calp being wanting.

d^1. *The Lower Limestone Shale* consists of brownish sandy shale and greenish calcareous grits, much decomposed near the surface, and alternating with lamina of black shale. Its thickness appears to be as much as 400 feet. It abounds in Fenestella and some shells.

d^2. *The Lower Limestone* seems generally to be a light-gray, compact rock; but there are occasional beds of dark-gray granular limestone. Generally speaking the bedding is much obscured by joints and weathering of the surface. Some thin beds of black shaly limestone, having chert layers, may be the degenerate representative of the Calp division; they appear at scattered intervals, and the boundary has been drawn chiefly by them.

d^4. *The Upper Limestone* is generally a dark-gray granular or compact limestone, with many light-gray compact beds; chert bands are common, particularly in the upper part. There are also some magnesian limestones in this division. Fossils, especially Productæ, are plentiful all through it. The total thickness of the limestone must be considerable, not less, perhaps, than 1,500 or 2,000 feet; but it is impossible to give a more exact estimate.

d^5. *The Coal Measures.*—The portion of the Coal Measures seen on this map consists of black, gray, and olive shales below, and olive grits alternating with shales and having occasional seams of coal above. The thickness may be about 2,000 feet.

The drift and final covering will be noticed hereafter.

4.—*Palæontological Notes.*

The Lower Carboniferous shale, at the locality one mile east of Farmersbridge, in a stream or ditch bounding the townlands of Ballindooganig and Gortbrack, mentioned by Mr. Foot, page 11, consists of a brownish sandy shale abounding with fossils, the shells having decomposed, their impressions are distinctly marked out by a thin ferruginous coating of a yellow colour: they are of great sharpness and beauty, many of the slabs, when separated, exhibiting casts of the interior and exterior markings—a condition which is of great value to the palæontologist.

The following is a list of the species:—

ZOOPHYTA.

Petraia pleuriradialis, *Phil.*, sp.

ECHINODERMATA.

Cyathocrinus variabilis, *Phil.* ××

MOLLUSCA POLYZOA.

Fenestella antiqua or plebeia, *Phil. Pal. Foss.** ×

BRACHIOPODA.

Spirifera laminosa, *M'Coy.*	×
,, striata var. attenuata, *Martin*, sp.	××
,, cuspidata, do.	
,, imbricata, *Sowy*, sp.	×
Producta pustulosa, *Phil.*	×

The mark × indicates the abundance of the species.

April 6, 1859. W. H. BAILY.

DETAILED DESCRIPTIONS.

[The whole of the district comprised in this sheet of the map was surveyed by Mr. F. J. Foot.]

5.—*Position and Lie of the Rocks.*

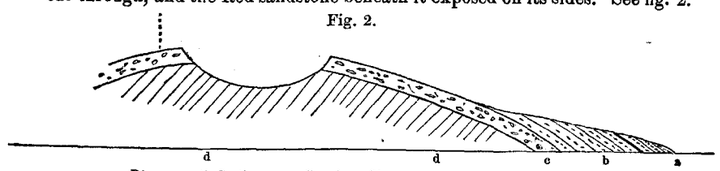
Old Red Sandstone.—To describe the structure of the Slieve-Mish range, we will commence at the S.W. edge of the map. In the Derryquay river, near its source, are seen Red sandstones and conglomerate beds, dipping N.E. at 15° or 20°; proceeding down the stream the conglomerate is seen to dip N. at 30° or 40°, and over this are Red sandstones, some of them conglomeritic, dipping N.W. at 25°.

These beds, a little further north, pass upwards into the beds of the Yellow sandstone, consisting of dull purple grits and shales, and brown or yellowish sandstones and yellow shale. This section ends about one-third of a mile south of Derryquay-bridge. The dip of the upper beds is N.W. at 30°.

Curraheen Glen is a very remarkable deep valley, running N.E. and S.W. along the crest of the Slieve-Mish ridge, from the foot of Baurtregaum, in sheet 161, under Glanbrack Mountain, to the foot of Knockauncorragh, when it turns due N. between that mountain and the one marked with a height of 1,707 feet.

In this glen, the conglomerate described in the Derryquay section has been cut through, and the Red sandstone beneath it exposed on its sides. See fig. 2.

Fig. 2.



Diagrammatic Section across Curraheen Glen. Scale, 3 miles to 2 inches.

a. Upper Old Red.
b. Red Sandstone, &c.
c. Thick conglomerate.
d. Red Sandstone, obliquely laminated.

* These species are probably identical.

To an observer not knowing the district and coming here for the first time the conglomerate would appear to rest unconformably on the upturned edges of the sandstone below, for it forms a nearly horizontal line or contour all round the upper part of the Glen and the underlying sandstones appear to dip S. or S.E. at 30° or 40°. The apparent lines of stratification are indeed lines of deposition, but it is believed that these sandstones were deposited on a slope, and that they form an example on a more than usually large scale of what is termed oblique lamination, the sandstones composing a thick stratum, the upper and lower surfaces of which would lie conformably under the conglomerate.

At the S. side of the glen the conglomerate dips S. or S.E. at 10° to 20°. At the west, near the summit of Baurtregaum Mountain, Sheet 161, it is horizontal, and here there is seen a small N. and S. fault, having a downthrow to the west of about thirty feet.

To the north of the glen, the conglomerate dips N.W. at 20° to 25°.

At the S.E. corner of the glen, at the top of the cliff, Red Sandstones dipping S. at 10°, rest on the conglomerate and the same beds are seen to the east forming a cliff S. of Lough Ablockaun and east of the trigonometrical point 1922, dipping S.W. at from 10° to 30°.

These are the beds described in the Derryquay section as lying over the conglomerate.

On the southern slope of the range in this neighbourhood another thin conglomerate bed overlies the sandstones last-mentioned; its representative on the north side of the mountain is probably a conglomeritic layer in the sandstone. At the west side of the Curraheen river, N. of the mouth of the glen, the conglomerate (of the glen) may be seen dipping N. at 25°.

Fine specimens of jasper and hornstone are to be had in the pebbles of Curraheen Glen, and for picturesque beauty as well as its geological features it is well worthy of a visit.

Sections are seen in the streams flowing through the townland of Annagh, farther E., the dip averaging 40°, in a direction N. or N.W.

At the elevation called Barnageehy, the upper conglomerate lies horizontally, but a little S. of the trigonometrical point dips S.E. at 15°.

The stream N. of Barnageehy affords a good section of the beds hitherto described, the sandstones becoming more or less conglomeritic, and sometimes a regular conglomerate.

The dip, which near the source of the stream is N. at 5°, increases in amount as we go N.; and at the upper part of the section, about three-fourths of a mile from the Tralee road, is N. at 35°.

In the stream which rises half a mile N.W. of the height called Knockmoyle, and flows N. through Glanaskagheen Wood, a very good section is exposed; the same remarks holding good about the dip as were made on the last section. The conglomerate of Curraheen Glen is well developed in it.

In two streams east of the north end of Glanaskagheen Wood are seen the beds of the Upper Old Red sandstone; they are soft, brownish sandstones, and purple or red shale cleaved into slate. They dip N. at 30° 45″. The strike of the cleavage is E. 25° N., its dip being S. 25° E. at 60°.

Farther east, in the cutting in the townland of Caherleheen, where the road forms a sharp bend in crossing the lower part of the glen, are red grits and slates underlying thick brownish-green grits and pale greenish sandy shale, dipping N. at 10° to 15°. The latter are probably Upper Old Red. Eastwards in the cuttings and streams are seen Red sandstones and shales dipping N. at 10°.

In the streams in the townlands of Gortbrack, East and West, and Ash-hill, good sections of the Upper Old Red sandstone are exposed; the general dip being N. at 20°.

At the western boundary of the townland of Gortatlea, about a quarter of a mile S. of Gortatlea-bridge, a small patch of green and brown grit is seen dipping N. at 20°. They are probably Upper Old Red. No rocks of this formation are visible further east.

On the southern slopes of Slieve-Mish the sections are not so good as those on the north. In the stream bounding the townlands of Curraghmore West and Garraun, about one mile N.W. of the hamlet of Knockaneacoolteen, are Red sandstone and slaty shales, dipping S. 20° E. at 30°.

Westwards, in the townlands of Knockbrack and Ballygamboon, Upper, on the side of the old road from Tralee to Miltown, and in the stream west of the road, are seen the same Red sandstones, sometimes conglomeritic, and red slates dipping S. at various angles from 10° to 30°.

The rest of the south slopes of Slieve Mish will be described in the explanations of Sheet 173.

Along the watershed of the range red conglomeritic sandstones are seen lying horizontally. East of Knockmoyle, at the trigonometrical point 1156, and at Knockawaddra, and further east, in the townland of Gurraun at the roadside, are red sandstones dipping S. at 5°. These have imbedded fragments of red slate and whitish grains like felspar.

Carboniferous.—The following places exhibit sections of the base of this formation or the Lower Limestone shale. About one mile east of Farmer's-bridge, in the stream or rather ditch bounding the townlands of Ballindooganig and Gortbrack west, at the south side of the road are seen greenish flaggy grits of a saccharine texture, with partings of black slate or shale, decomposed calcareous sandstones, full of Fenestella and brownish sandy shale, with laminæ of black shale also full of Fenestella and shells. These beds dip N. at 20°. East of these, in the next stream, which separates Gortbrack east, from Ash-hill, and at the N. side of road, the same beds are seen dipping N. at from 25° to 30°; also in the stream east of Ash-hill ruined house, and on the side of the old road, when they dip N. at 10°.

About one mile and a-quarter somewhat N.W. of the village of Currans, east of the Killarney road is a quarry in which is seen dark grey crystalline limestone with partings of brownish calcareous sandy shale and bluish shale, containing Fucoids. These beds dip S. at 15°. The dip of the cleavage is S. at 55°. Two more quarries exhibiting similar beds are seen, one about half a mile S.E. of the last described, where the dip is N.E. at 5°; and another on the roadside, at an old fort, half a mile west of the village of Currans, in which the dip is S. at 10°. In these three quarries Fucoids are plentiful as well as Fenestella and some shells. The bed of limestone is about two feet thick; these beds are probably above those mentioned as seen in the stream near Ash-hill House.

The Lower and Upper Limestones.—No continuous sections are seen anywhere in the Limestone of this district, and as the boundary between Upper and Lower is quite arbitrary, both will be described together.

The Limestone spreads over the plain where it may be seen in numerous quarries, the principal of which will be mentioned.

We will commence this description at the N.W. corner of the map.

This part of the country is considerably covered by drift and alluvial land, which obscures the Limestone. A few quarries, however, appear at scattered intervals, as in the townlands of Cahernead and Kilbrickaun, N.E. of Ardfert, at Fortwilliam and near Kilgulbin House. About one mile and a-half west of Abbeydooney, it crops out in craggy knolls, in which the dip is obscured by joints and weathering of the surface; in these places it is chiefly dark gray granular and sometimes compact Limestone. A little more than one mile N. of Ardfert, a group of quarries exhibit a synclinal and anticlinal fold; the beds in the most northerly of the quarries dip S. at 60; near the trigonometrical point 149, they dip N. at 60, and a little S.E. of this S. at 70. Further eastward, in the townland of Clogher, the dip is E. at 25° to 30°. The Limestone of these quarries is a thick bedded bluish gray granular, and also dark gray flaggy Limestone, with chert layers. Fossils are abundant.

At the village of Ardfert, is a quarry of light gray flaggy Limestone with

shale partings, some thin compact finely laminated beds, and also thick massive limestone; the dip is N. at 50°, and N.E. at 20°. At Rahoneen Castle, at the sea shore, one mile and a-half S.W. of Ardfert, are beds of dark gray, light gray, and pinkish, compact thin bedded Limestone with bands of gray chert, nearly horizontal. The pink beds are so compact as to become a marble which would polish.

Two miles south of Rahoneen Castle, at Ballygarran, are light gray cherty beds, dipping E. at 10°. Further south, along the shore, from Bay View to the Spa, are beds of light gray compact and dark gray fossiliferous limestone, with partings of black shale and sandy ferruginous shale. These beds dip to the S., at angles varying from 25° to 70°. East of Frogmore, in the townland of Kerries, West, is a large quarry of light gray compact Limestone, abounding in fossils, such as Corals, Trilobites, and shells. The bedding is not visible; there are numerous veins of carbonate of lime, and a dyke of magnesian limestone, to be seen in this quarry.

In the townland of Clogherbrien, the Limestone crops out in a craggy, elongated knoll, in which the stratification is obscured by joints and cleavage. This is a good fossil locality.

At Tralee, north of the canal basin, are quarries of gray granular limestone, thick and thin-bedded, and full of fossils; the beds are contorted, but their average dip is S.E., at from 10° to 20°. This limestone is a good stone for building, and the quarry is extensively worked.

East of Tralee, at the opposite side of the road from the union workhouse, are numerous quarries, in all of which the stratification is very obscure; they consist chiefly of dark gray compact limestone, and abound in fossils. South of these, however, two quarries on the roadside, one in the townland of Camp, the other in Caherleheen, show a plain dip of S. 10 E., at 40° or 45°.* They consist of light gray compact limestone.

At the north side of the road, opposite Ballyseedy demesne, some quarries exhibit beds of black, shaly, impure limestone, very thin, and dipping N. at 70°. Similar beds appear east of this, on the road side near Knockavinnane Cottage: they may possibly represent the Calp.

West and N.E. of Ballycarty, are quarries of light gray compact limestone, dipping N. at 75°; and southwards, in the townlands of Gortbrack, East and West, a little north of the stream section in the Lower Limestone shale above described, are quarries of dark gray granular limestone, dipping N. at 30°. N.W. of Arabela House, quarries of light gray compact limestone show a dip of 75° to the N. This stone is useful for many purposes, and the quarries are extensively worked.

Northward in the townlands of Carrignafeela and Potaley, and about a quarter of a mile S.E. of Ahnambraher bridge, the Limestone, which is dark gray and compact, forms craggy knolls, and is full of water-worn caves; it is nearly horizontal, dipping N.W. at 10°, and S.W. at 5°, and is traversed by vertical joints running N. and S. Further east, in the townland of Crag, are quarries of dark gray granular limestone, horizontal, and then dipping E. at from 25° to 30°. Fossils are abundant here. In the streams north of these last-mentioned localities, the Coal Measure shales appear, dipping N. at various angles.

South-eastwards at "*Fairy Gate*," east of Clogher R. C. Chapel, is a knoll of dark gray limestone, dipping N. at from 20° to 70°. Some years ago a shaft was sunk here for lead, and some ore was found. It is impossible, however, now to trace any lode. A little east of this, in the river bed at the south side of the road, are black, thin-bedded shaly limestones, probably close to the base of the Coal Measures; they dip S.E. at 45°. Further east, in the bed of the stream, near Poulacoperas, are the basal Coal Measure shales, dipping

* These southerly dips must be considered only as local undulations.

N.E. at 40°. Further east, in the townland of Crag (parish of Nohaval), the limestone, which is dark grey compact, forms craggy knolls, in which are caves worn by water, some of which can be traversed for some distance; the beds are contorted; the general dip is N. W., at 20° to 60° on the north side, and S. at 30° to 60° on the south side.

East of this, all along the banks of the stream which flows through the townland of Mullaghmarky, is a good exposure of rock; the beds are dark gray compact limestone, much contorted. On the roadside, near Mullaghmarky house, is a quarry of light gray flaggy limestone, with partings of black shale, dipping N. at 20°.

West of Castleisland, on the banks of the river Maine, is a good fossil locality, in beds of light gray compact limestone, which are horizontal, or dip N. at 15°. In several quarries, S.W. and S. of Castleisland, the beds show a dip to the S., varying from 10° to 45°; and still further S. and S.E., the dip is at various angles in the same direction. E. of Castleisland, in the townland of Tobermaing and Ballymacadam, the beds dip N., at various angles.

The source of the river Maine is at a picturesque spot, in the townland of Tobermaing, a quarter of a mile E. of Tobermaing House. There is a deep, conical, oval-shaped hole in the ground, the dimensions of which are, about 100 yards in length by 60 in breadth, and 40 or 50 feet in depth; at the N. side of it is a spring, the source of the river, which flowing for about 35 yards in a S.E. direction, disappears again, and pursues its subterranean course from E. to W., for about a quarter of a mile, when it again rises to the light, at the road-side S. of Tobermaing House.

The limestone near the spring is much water-worn, and the dip is obscure. It is a dark gray compact, and very massive rock.

Coal Measures.—Most of the stream courses of the Stacks and Glanruddery mountains, afford sections of this set of beds. The following are among those best seen—commencing at the north of the map:—In the Shanow river, west of the village of Kilflyn, are olive grits and gray shales, the general dip of which is to the N. at various angles.

In the ravine at the source of this stream, similar beds are seen to dip S.E. and then S., at from 25° to 50°. In the tributary of the Shanow, which joins it a little east of the village of Kilflyn, there is a good section of grits and shales, the beds appearing contorted. Near the source of this stream, at the western boundary of the townland of Cappagh, a seam of Anthracite, 3 inches thick, appears; the dip is N. 20° W. at 70°. The section is as follows:—

	Ft.	In.		Ft.	In.
4. Dark shale . . over	10	0	2. Olive shale . .	10	0
3. Coal	0	3	1. Olive grit* . .	—	

This Coal was worked many years ago, but no information respecting it can now be obtained. It may possibly be the same Coal as appears west of Rathea, in Sheet No. 151.

South-east of the village of Abbeydorney, in the stream which flows through the townland of Lackabeg, at the south side of the new line of road, some beds of dark gray nodular shale, with grit bands, are traceable for some distance along the strike; towards the west they appear to dip S.E. at 50°; but going eastward they become vertical, and then dip N. 10 E. at from 30° to 45°.

West of this, and east and south-east of Tubrid House, near the road, are beds of dark gray, sandy, and flaggy shale containing calamites, and dipping S.E. at from 25° to 50°.

Southwards, in the townland of Liscahane, at the S.E. side of it, and half-a-mile E. of Tobernamolt, is a quarry of olive grits, with partings of black shale, dipping E. 35°, S. at 35°.

* No. 1 is the lowest bed, the strata being numbered upwards.

Further south, on the hill north of Plover Hill, are two quarries of beds of olive gray grits, with shale partings, dipping N. at 50°. North of the Limestone boundary, east of Ballyroe Lodge, in the streams and ditches along the slope of the hill, dark gray shales are seen, the dip of which is obscure.

In the stream between the townlands of Garrane and Laharan, N.E. of Oakpark House, is a tolerably good section, extending for more than half a mile N. and S., and exposing beds of strong olive grits, over which are black and gray shales and grit bands, dipping N. 30°, W. at various angles. In the lower beds plants are abundant.

East of this, sections in contorted beds, are seen near the limestone boundary, in streams in the townlands of Knockawaddra Middle and Ballinosherig East, north of Tullygarran House.

On the southern slope of Ballincollig hill, the streams afford good sections, the beds being much contorted. Near the limestone boundary dark shales are always seen, and the dip is in a northerly direction, except where the edges of the beds are turned in the opposite direction by the fall of the hill.

In the Glanageenty river, which flows through a picturesque glen, is a tolerably good section, although rather broken. The beds nearest the limestone are those seen north of Clogher R. C. Chapel; they are olive gray grits, forming a dome or having a *quâ-quâ versal* dip; the beds dipping N, S, E, and W, at various angles from 10° to 40°. At the wood, a bed of dark gray shales is traceable for more than half a mile. From the east end of the wood, as far as the source of the stream, a distance of a mile, in a direction east and west, grits and shales have a tolerably steady dip to the east, at angles varying from 10° to 50°. On the slope of the hills, south of Glanageenty Wood, all the streams exhibit contorted beds of grits and shales.

The River Smearlagh and its tributaries also afford good sections. In a direction east and west from Mount Hawk, near which the Broughhan river (a tributary of the Smearlagh) takes its source, for more than half a mile, beds of olive gray micaceous flags are traceable along their strike, dipping N., at an average angle of 45°.

Proceeding northwards, to the junction of the streams, and then along the Smearlagh in its northerly course, a non-continuous section, through contorted beds of grits, flags, and shale, is seen. The cleaveage is well shown in many places, its dip being S.E. at about 60°.

In the Dromaddamore river, which flows from east to west, and joins the Smearlagh at the N.W. corner of the townland of Broughane, at about halfway from its source to the confluence, is a little seam of Coal, about one inch and a half or two inches thick; the beds are slightly contorted, the general dip being at this place, S. W. at 20°. The section is :—

	Ft.	In.		Ft.	In.
5. Dark gray shale . .		—	2. Olive shale . . .	1	0
4. Black shale . . .	10	0	1. Olive gray grit . .		—
3. Coal.	0	2			

Proceeding westwards, the strike of the rocks nearly coincides with the direction of the river, and but a small thickness is seen; the dip is S. at from 20° to 50°. The beds are dark gray shale under olive grits, and concretionary shales. They are probably all above the Coal. Northwards, along the Smearlagh, from its junction with the Dromaddamore river, the beds are much contorted, and the section non-continuous, which prevents us seeing more of the Coal.

In the Glashoreag river which flows from west to east into the Smearlagh, a little bed of Coal is traceable for some distance.

At the N. side of this river in the townlands of Knocknacurra and Reanagowan, the Coal was worked by levels more than forty years ago. No information can now be got respecting it, but numerous pits are to be seen at intervals near the bank of the stream. Near the pits the beds of grit and shale in the river bed dip S. 25° E. at 30° or 40°.

In one place, west of the bridge in the townland of Carrigcannon, the Coal is visible. The section is:—

5. Ripple marked gray grits.	2. Gray shale.
4. Gray sandy shale.	1. Olive grit.
3. Coal, 3 to 5 inches.	

There are probably two faults parallel to each other and running in a direction N.W. and S.E.; one of them where the Coal is visible, the other at the boundary between the townlands of Knocknacurra and Beanagowan; or else the Coal seen in the section is a separate seam and above that formerly worked. In the Smearlagh the Coal is not visible.

For two miles and a-half north of the junction of the two rivers, the direction of the Smearlagh is north and south, and the rocks are much contorted. Then for nearly two miles its course is from W. 20° S. to E. 20° N., and the beds are traceable along the strike which is nearly in the same direction; their dip being S. 20° E., or S. at from 30° to 50°; of course only a small thickness is visible. The river again flowing in a northerly direction exhibits a non-continuous section in contorted beds. For the rest of the Smearlagh section, see explanations of Sheet 151.

South of Boolavore hill, a stream flowing from W. to E., exhibits a section along the strike, the beds of olive and gray grits, flags, and shale, dipping south at 70°. Still southwards, the Glashantooreen stream and a tributary, show an interesting section. This tributary flows from west to east, and a little west of the junction of the two, where the dip of the beds is S. at 70°, a two-inch seam of Coal is visible. It is probably the same as that described in the Dromaddamore river, (see page 14). The section is as follows:—

	Ft.	In.		Ft	In.
5. Dark gray sandy shale. .		—	2. Olive gray shale (about)	1	0
4. Black shale . (about)	10	0	1. Olive grit, ...		—
3. Coal, ...	0	2			

Proceeding S.W. up the Glashantooreen stream are seen beds which apparently overlie this Coal; gray and olive grits and flags, and shale, dipping S. or S. 20° E, at from 50° to 70°.; another seam two inches thick is then seen, also dipping S.

A little further S. the beds flatten out and then dip N. at 70° or 80°; and the same Coal as that last mentioned again appears. S. of it the rocks are much contorted; and at about 400 yards further S.W. a two-inch seam is again seen, dipping N. at 85°.

For about sixty yards southwards, beds of olive grit below this Coal, dip N. at 85°. There is then a gap in the section for about 400 yards, when a three-inch seam of Coal appears, interstratified with black shale resting on olive grit and dipping N.W. at 75°.

The vertical sections wherever the Coal is seen in this stream, are much alike; and the thickness of the Coal only varies from one and a-half inch to three inches. They are all probably the same bed, caused to re-appear by contortions. See section.

Fig. 3.

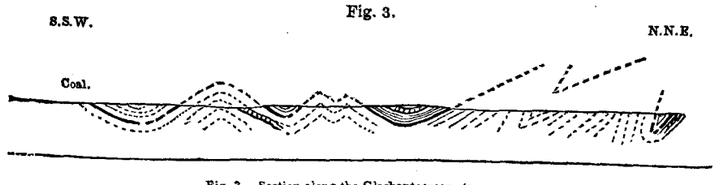
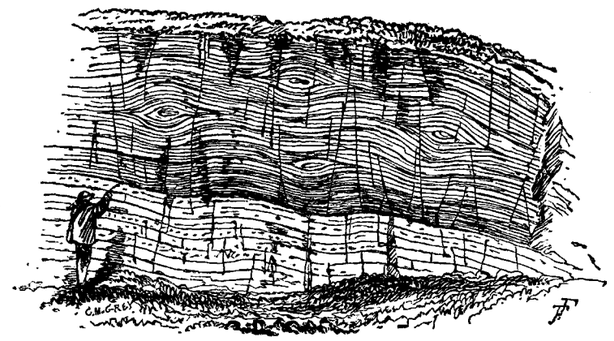


Fig. 3. Section along the Glashantooreen stream.
Scale, 3 inches to 1 mile vertical and horizontal.

S. of Knockalip all the streams exhibit sections. In that flowing through Dooneen wood, the beds appear to dip to the N. at various angles.

In the townland of Dooneen, about half a mile N. of Mullaghmarky House, not far N. of the limestone boundary, and at the E. bank of the stream, are seen horizontal beds of dark gray shale, with concretionary nodules of considerable size. See fig. 4.

Fig. 4.



Quarry in townland of Dooneen, showing concretionary structure in beds of gray shale.

These concretions are elliptical in form, the direction of their major axes being the same as that of the planes of the stratification.

About one mile N.E. of Ballymacadam, a stream flowing N and S. through the townland of Kilcusnaun, exhibits a section in contorted grits and shales.

6.—*Drift.*

The limestone plain is in most places covered by limestone gravel, clay, and boulders; the limestone rock appearing at intervals through it.

A considerable patch of this limestone gravel obscures the beds of the eastern end of Slieve-Mish, it is not pure limestone debris, but has fragments of the Old Red sandstone intermingled with it. In like manner, whenever the limestone gravel covers a portion of the coal measures, which it does in many places, the debris of the rocks of that formation are mingled with it.

On the north slope of the Slieve-Mish range, extending from the mouths of the glens towards the sea, at Tralee bay, are seen lunette-shaped mounds, consisting of large irregularly shaped fragments of Red sandstone, conglomerate, and clay, the debris of the rocks which are seen *in sitû* in the glens. Sections through these mounds show no sign of stratification; large and small fragments and clay are heaped together confusedly. They are probably the *moraines* of glaciers which descended in ages past from the glens to the sea.

The north-western portion of the map is covered with a considerable portion of local limestone gravel.

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