EXPLANATIONS

TO ACCOMPANY

SHEETS 140 AND 141 OF THE MAPS

OF THE

GEOLOGICAL SURVEY OF IRELAND,

ILLUSTRATING PART OF THE

COUNTIES OF CLARE AND 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 in Dublin.

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

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

Condensed memoirs on particular districts will also eventually appear.

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

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EXPLANATIONS

TO ACCOMPANY SHEETS 140 AND 141 OF THE MAPS

OF THE

GEOLOGICAL SURVEY OF IRELAND.

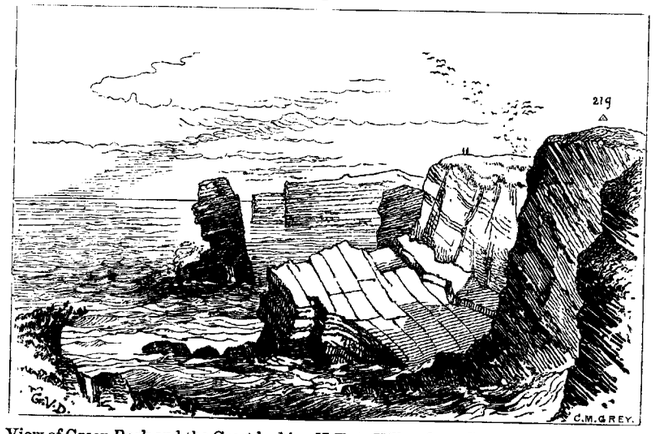
General Description.

These sheets of the map include the south-western part of the county Clare, lying N. of the mouth of the Shannon, and a small part of the northern corner of the county Kerry on the S. of that river. In the former are situated the towns of Kilrush and Kilkee, and the villages of Cooraclare, Cross, Carrigaholt, and Kilbaha.

1. *Form of the Ground.*

This part of the county of Clare is an undulating tract, stretching away westward in a long narrow promontory, the termination of which is Loop-head. The length of the promontory from Poulnasherry Bay to Loop-head is sixteen miles, in a direction about W. 30° S. Its greatest breadth (a little W. of Poulnasherry Bay) is five miles, from which point it varies considerably towards the west, on account of the irregular form of its southern shore. Thus, at Carrigaholt, it is nearly three miles broad; at Kilbaha, one and a-half; while, approaching Loop-head, it rapidly contracts, so that half a mile before reaching that point its breadth is little more than one-fourth of a mile. It is bounded by precipitous cliffs, which, in many places, assume fantastic forms, resulting from the action of the sea on the rocks. On the N.W. shore these cliffs attain in some places to an

Fig. 1.



View of Grean Rock and the Coast looking N.E. to Kilkee from Gattaphilenatraw Point.

elevation of 200 feet perpendicularly above the sea; but along the shore of the Shannon they do not exceed 100. The most conspicuous hills on the promontory are Moveen hill, two and a half miles S.W. of Kilkee, and Rehy hill, on the southern shore, about three miles S.W. of Carrigaholt. The former rises 451 feet above the sea, and the latter 386 feet.

The higher grounds of the Loop-head promontory command extensive views on a clear day: looking towards the north, the mountains of Connemara may be distinctly seen, with the islands of Arran in the foreground; while, towards the south, Brandon and the other mountains of the Dingle promontory stand out in bold relief, with Magillicuddy's Reeks, and the other mountains near Killarney, still farther towards the left.

N.E. of Poulnasherry Bay, the country is a boggy plain, the mean elevation of which is not more than sixty feet. It is enclosed on the W., S.E., and E. by higher ground, rising in some places, as N.E. of Kilkee, and N. and N.E. of Kilrush, to 250 feet above the level of the sea.

The shore of the Shannon, S.E. of Kilrush, is very varied in form: in some places the ground terminates abruptly in cliffs ranging from forty to 100 feet in height, while at others it slopes almost imperceptibly towards the river.

Of the small portion of Kerry included in this map, the greatest elevation is a point 383 feet above the sea, two miles S. of Beal, and on the N. flank of Knockanore mountain (see sheet 151). The ground falls towards the east to the sea level at Ballylongford Bay. East of Ballylongford Bay the outline of the country is irregular; the highest point, 381 feet, is in the townland of Dooncaha, about one mile and a-quarter S.E. of Sallow-glen house. The slope towards the Shannon is generally very gradual, except at Ardmore point, where there is a cliff forty feet in height.

The width of the Shannon between the shores of Clare and Kerry, in this map, varies from two to three miles.

2. *Geological Formations.*

		Colour on Map.
	Bog, Alluvium, and Superficial deposits.	*Pale sepia.*
Carboniferous.	d^5 Coal Measures.	*Indian ink.*

The Coal Measures consist of olive grits, and olive and grey flags, interstratified with grey and black shales, and some little beds of coal. From the very imperfect sections in the district, it is difficult to say with accuracy what may be the thickness of as much of this formation as is seen on this map. The only connected section on the Clare side of the Shannon, is that along the western coast. In two different localities there occurs a little band of hard grey limestone, full of fossils, such as Encrinites and Goniatites, and interstratified with black shale, which also abounds in fossils.* The calcareous

* A block of this limestone band, collected by Mr. Foot from the boundary of the townlands of Lisroe and Boolyneaska, Co. Clare, $\frac{1}{4}^{o}$, contained crinoid joints, and small Orthoceras, with Goniatites crenistria in abundance. At a similar deposit near the Puffing Hole, Kilkee, I observed the surface to be covered with small carboniferous corals, (*Zaphrentis.*) and Polyzoa; an abundance of crinoid joints occurred throughout the bed, with a few Brachiopods.—W. H. B.

band is never more than a foot thick, but is evidently the same band wherever it occurs, and thus forms a good horizon.*

There appear to be below this band about 2,700 feet of grits and shales, and about 800 feet over it. There is, at all events, a thickness of more than 3,000 feet of coal measures seen along the western coast without reaching either the lowest or the highest beds of the formation.

From the great amount of superficial covering that intervenes, it is almost impossible to establish any connexion between these beds on the coast and those seen E. of Kilrush. In the latter part of the district, beds of shale are much less frequent than near Kilkee, having perhaps been swept away by denudation, and the harder grits alone are seen; and these are all so similar to each other, that it is very difficult, if not impossible, to trace any particular bed or set of beds through them to serve as a geological horizon.

Small seams of coal are seen in three different places. They are probably three distinct beds. They will be mentioned in the detailed description.

On the Kerry side, we have an apparent thickness of 3,000 feet of grits, flags, and shales, without any coal being seen; the lowest beds are only about 1,000 feet above the top of the Upper limestone, which is seen in the next sheet to the southward, No. 151.

The dark shales in the county Clare abound in fossils, such as Goniatites and Aviculo-pecten; and in some places near the thin beds of coal, great stems of Stigmaria, as also large specimens of Calamites and other plants may be seen.

The grits, especially the more fine-grained and thin bedded ones, which are largely quarried for flagstones near Kilrush and Kilkee, are often covered in the most wonderful manner by tracks of marine animals. The whole surfaces of these flags, over areas of many yards in diameter, are often so entirely occupied by what looks like a matwork of track over track, that it would be impossible to find a sufficiently clear space to spread the hand, sometimes even to lay the finger without touching one. Tortuous tracks of all sizes, from the width of a lead pencil to one of an inch and a half across, wind in rapid convolutions over the whole stone, and may be studied either in the hollows or moulds left in the upper surface of the flags, or in the raised casts of those moulds on the under surfaces of the flags when lifted up.

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

As there is but one geological formation in the district included in these maps, it is of course impossible to point out any peculiarities in the form of the ground, as characterizing different groups.

The most prominent eminences usually consist of the grits, as being the hardest and most indestructible of the rocks, while the valleys, hollows, and flats, are most usually found in those parts where the

* This calcareous band was first noticed by John Lloyd, Esq., C.E. See *Journal of Geological Society*. Dublin, vol. vi., page 187.

softer shales lie below. This shows that the variations in the form of the ground here, as elsewhere, are the result of the unequal yielding of rocks of different degrees of hardness and tenacity to the action of the denuding agencies.

These agencies were, primarily, the breakers and currents of the sea as the country rose or fell through its upper surface; and, secondarily, the atmospheric influences whilst it has remained dry land.

The internal disturbing forces of elevation and depression, though they were the primary causes of the movement of the whole country, have had but little direct influences on the form of its surface, since the rocks are often inclined beneath a level plain, and lie horizontally beneath a hill, or are bent and contorted in various directions quite independently of the undulations of the surface.

F. J. F.

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4. *Palæontological Notes.*

The following observations were made on some of the fossil localities mentioned in sheet 141.

In the townland of Poulnadaree ($^{6,7}_{4}$* Clare), on the coast near the Boat Quay, are alternating grits and shales of the Coal Measures; in these beds fine examples of Stigmaria ficoides were exposed, some of them being upwards of six feet in length, with a nearly uniform diameter of three and a-half inches, and having numerous compressed rootlets attached; these long cylindrical and punctated bodies are now known to be the roots of Sigillaria, a large fossil plant allied to Lepidodendron, and probably, like it, belonging to the Lycopodiacea; the remains of the central column or axis in these roots was observed, and may be easily detached, especially where the surrounding soft tissue has been forced back by pressure—a peculiarity in the structure of Stigmaria which has been also noticed in Sigillaria, and considered by Dr. Jos. D. Hooker, to be a condition representative of the vascular tissue.†

From the shales near the above locality, E. of Kilrush, Mr. Foot collected several fragments of branchlets belonging to a Fern named by Brongniart *Sphenopteris latifolia*, a species which also occurs at Bilboa Colliery, Queen's County, as well as at Coalbrook Dale and Newcastle, in England.

At one mile N. of Kilmurry, E. of Kilrush, are thinly laminated shales, with *Aviculo-pecten papyraceus* and *Goniatites crenistria*.

From black shales at the Puffing Hole, Kilkee, the following fossils were obtained :—Limestone band (see p. 6), *Plant stems*, crinoid stems, small corals, (*Zaphrentis*), *Producta Martini?* *Aviculo-pecten papyraceus*, several small bivalve shells of the genera *Nucula, Sedgwickia, Edmondia*, &c., with *Goniatites crenistria*.

At Farrihy shore, three miles N. of Kilkee, Mr. Foot collected a fine specimen of fossil plant stem, *Diploxylon elegans* Corda (Sternbergia transversa Artis). These stems have generally a thin coating of coal, and are characterized by a transverse wrinkling and spirally-arranged markings. It is considered to be allied to Sigillaria.

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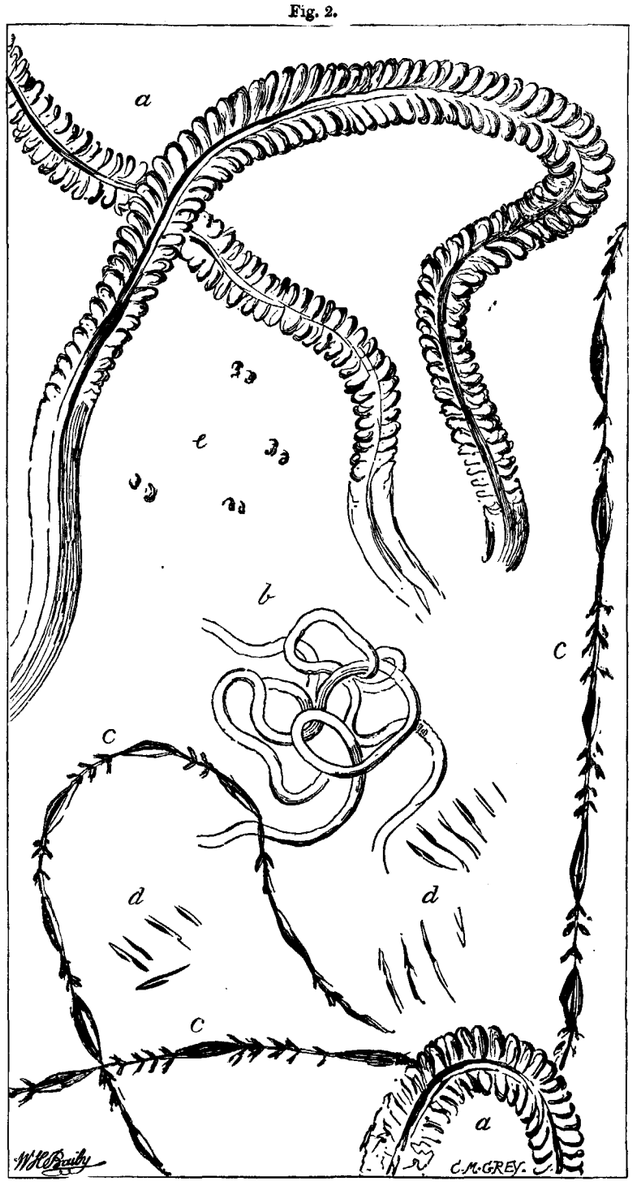
* Each sheet of the six-inch maps is divided into quarters, 1 being the N.W., 2 the N.E., 3 the S.W., and 4 the S.E. quarter, therefore, $^{6,7}_{4}$ means the S.E. quarter of the 67th sheet.

† Memoirs of the Geological Survey of Great Britain, vol. 2, part 2, p. 419. See also Lindley and Hutton, Fossil Flora, vol. 1, pl. 35, and an elaborate article by Professor William King, on the genus Sigillaria, in which he describes this fibro-vascular structure, and shows the evident connexion between the Sigillaria stems and their roots, Stigmaria. Edinburgh New Phil. Journal, 1844–5, vol. 36, pp. 4 and 272; vol. 37, p. 62; vol. 38, p. 119.

Fig. 2.



Drawn from rubbings taken from different parts of the same slab.

On the shore at Trusklieve, eight miles S.W. of Kilkee, the shales abound with the *Aviculo-pecten papyraceus*.

In the townland of Kilbaha, County Clare, $\frac{7}{3}$1, the usual Coal Measure fossils abound, viz.: *Plant stems*, small *Posidonomya Becheri?* *Goniatites crenistria* in various stages of growth, mostly young individuals, *Orthoceras Steinhauerii*.

The Coal Measure flags of Money Point, near Kilrush, are fine-grained grits, evenly jointed, and readily separating in the line of bedding; they are remarkable for presenting surfaces covered by tracks and markings caused most probably by marine animals; several varieties of these markings are shown in the wood-cut, fig. 2, p. 9. They are all drawn of the actual size, and from one slab of stone; one of the most abundant, represented at *a*, is a convoluted marking of about one foot in length, and four-tenths of an inch in diameter, having a broad central median line, with lobe-like impressions on either side, giving it a frilled appearance, which gradually becomes less distinct, passing into a smooth ridge with a furrow on either side.

A much smaller and more tortuous marking is shown at *b*, its diameter being somewhat less than the tenth of an inch; it is quite smooth and highly convoluted, the convolutions twisting about in all directions, and often crossing each other.

A remarkable and distinct series of impressions is figured at *c*. This form has a very peculiar chain-like appearance, and can be traced, in some instances, for a distance of between two and three feet, its direction being sometimes straight or slightly curved, and in other instances, turning at nearly right angles; it presents a very uniform and well defined impression, consisting of a series of deeply sunk elongated lozenge-shaped markings, between each of which are four angular cuts of an arrow-head form. Other markings occur more sparingly on these slabs, those represented at *d* being a series of little flicks or strokes, and at *e* are shown several pairs of small depressions, which may have been caused by burrowing Annelides.

It will appear obvious, however, that no certain conclusions can be arrived at respecting the nature of the animals by which these markings were caused. Similar forms to some of them have been ascribed by various observers to Annelida, Mollusca, and Crustacea;* but the reference to any special class can be only conjectural at present, although it is most probable they were caused by marine animals belonging to some of these classes. As an instance that sea-shore markings of this character are not entirely effected by marine animals at the present day, I may mention having been informed by Mr. C. W. Peach, of Wick, to whom naturalists are indebted for many original observations, that he has witnessed a small beetle making a very curious burrow through the sand on the sea-shore, which may easily have been mistaken for the track of a marine animal.

W. H. Baily.

October 4, 1859.

* See a paper by Mr. Albany Hancock, Annals of Natural History, 3rd series, vol. 2, 1858. Palæontological Notes in Explanations to Sheet 128, pp. 14, 17; and Professor Haughton, *Journal of Geological Society of Dublin*, vol. viii., part 2; and *Natural History Review*, vol. vi., 1859, p. 512, pl. 22 to 25.

Detailed Description.

[The district included in these maps was surveyed entirely by Mr. Foot, by whom also these descriptions have been drawn up.]

5. *Position and Lie of the Rocks.*

Coal Measures.—I shall first describe the sections along the shore of the Atlantic, commencing at the northern edge of the map.

At Farrihy Bay are beds of olive grit and dark gray and black shale, forming a basin; those at the north side of the bay dip S.W. at 30°; those at the east side W. at 25°; and those on its southern side N.W. at 30°. At the last-mentioned place, a little west of St. Brenden's Well, are seen black shales, with thin strings of culm, resting on a bed of olive gray grit, on whose surface are seen stems of plants carbonized; proceeding S.W. along the shore, the N.W. dip continues steady at 30° for a distance of about one mile and a-quarter from the S.E. corner of Farrihy Bay. The direction of the coast line coincides with the strike of the beds. At this distance, the dip increases to 50°; from this point southwards, the cliffs are very precipitous. There is, a little south of this point, a thick bed of black shale, containing Goniatites. For some distance southward, the dip is N.W. at 25° to 30°, and then east of Lackglass, the beds become horizontal; from this to Atlantic Lodge, they appear with a general horizontality, undulating at low angles to the N. and S. A little N. of Atlantic Lodge, a contortion gives a dip of 60° to the S., and then the beds become perfectly flat; on the S.W. shore of Moore Bay are beds of olive and gray grits and flags, dipping S.E. at 30°, the angle decreasing a little westward to 15°. These beds are traceable inland in a S.W. direction, along the new road, as far as the shore at Illaunawilla, the dip being S.E. at 25° to 30°. The surfaces of the flags exhibit the curious tracks, of which an account has been already given. These flags are now quarried, though not extensively, near the shore of Moor Bay.

At Duggerna Rock and Knockroe Point, the beds are horizontal, and W. of the latter place, at the Puffing Hole, is seen the band of limestone mentioned in the general description, interstratified with black shales. It varies in thickness here from 3 to 5 inches. Southward, superior beds, among which are the "track-marked" flags at Illaunawilla, dip S. at 30°.

The beds dip S. for some distance S. of Illaunawilla, where the cliffs are about 200 feet in perpendicular height. They then become horizontal as far as Foohagh Point, where they again dip N.W. at 10°, and at Bishop's Island, N. of this point, at 5°. At Foohagh Point, some small faults are seen southward; the rocks are much contorted; the same beds being visible still along the cliffs.

There is apparently a dip of from 10° to 40° to the south for about three-quarters of a mile, as far as Doonlicka Castle. The beds at the castle dip S. at 5°; but on the shore, west of it, they dip S. at 30°; they then curve round and have a general dip to the W., and at from 10° to 20°; opposite to Illaunonearaun they dip N.W. inland at 30°, at the edge of the cliff at 60°, and then at the foot of the cliff at 20°; the dip at Illaunonearaun is N.W. at 20° or 30°.

At the mouth of Bealanaglass Creek, the dip is N. 20° W. at 30°; but inland, at the head of the creek, the beds are horizontal; going westward from this, along the cliffs, the beds exhibit a small anticlinal curve, dipping, N. or N.E., at from 25° to 40° on the sea side, and inland S. or S.E. at 20° to 30° (*the edge of the cliff running along the axis of the anticlinal*). On the hill at Oldtown, are olive grits and flags, dipping N. at 10° to 20°, and traceable along the strike for half a mile. For about two miles from the point called "*Breaker*," to "Croan" rock, at the west end of the townland of Trusklieve, we see a dip of about S. 20° E., at angles varying from 20° to 50°; the general direction of the coast being that of the strike of the rocks. A little W. of Illaunglass, the band of limestone seen at the Puffing Hole, west of

Kilkee, again appears, associated with the fossiliferous shale; its thickness here is three inches; above the limestone band is seen a thin string of slaty coal. The vertical section here is as follows:—

	Ft.	In.
10. Olive grits and flags,	–	–
9. Black and gray shales,	30	0
8. Pyritic shale (with fossils),	1	3
7. Coal or kelve,	0	1 to 0
6. Quartzose band (slickenside surface),	0	5
5. Limestone band with encrinites,	0	3
4. Black shale (fossils),	10	0
3. Olive grits and flags,	50	0
2. Black shale (fossils),	25	0
1. Olive grits,	–	–

The dip is S. 20° E. at 40°. This dip continues steady in direction as far as the north side of the little bay S. of Croan rock; but increases in amount to 50°. At this bay (which we may call Gowleen Bay, from the rock bearing that name), the beds form a beautiful synclinal curve becoming horizontal at its east side, and at the south dipping N. at 20°. Some beds of coal are seen. The following is the vertical section:—

	Ft.	In.
6. Olive grits and flags,	–	–
5. Black shale (with goniatites), having ironstone bands, and thin strings of culm,	20	0
4. Coal (in cubes) or culm,	0	1 to 1½
3. Pyritic clay and kelve,	4	0
2. Indurated gray or olive clay (fire clay),	1	6
1. Olive grits (same as No. 10 of last section),	–	–

These beds probably occur also at Intrinsic Bay above the limestone band W. of Kilkee; but the cliffs are so precipitous and inaccessible, that an examination is impossible.

At Gowleen Bay they can only be examined at the little stream on the S. side of the synclinal. South of the bay the limestone band is not again seen; the place south of Duloughry's Island, and N. of Tullig Point Island, where it might be expected, being inaccessible.

A little N. of Tullig Point is a bed of black shale resting on olive grit. It is probably near the limestone band. The olive grit is traceable for more than a mile and a half inland, along an old road that runs E. and W. through Tullig. At that distance from the shore, the black shale is also seen over the grit, dipping N. 20° W. at about 20°; but the limestone band is not visible.

For a mile S. of Tullig Point, the beds dip N. at various angles. In one part there is a dip of from 45° to 60° N. This section gives an apparent thickness of 2,700 feet of grit and shales below the limestone band.

Near the boundary between the townlands of Quilty and Oughterard, half a mile S.S.W. of "*Doondoilroe*," are two beds of black shale, having goniatites and aviculo-pecten, and also strings of kelve.* The dip is N. at 45° to 55°.

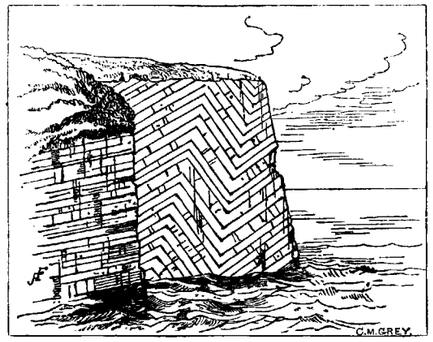
About a quarter of a mile S. of this, where the direction of the line of cliff is E. and W., the beds at the edge of the latter are horizontal, and dip seawards at 5°. Proceeding along the shore from this to the hamlet of Ross, the beds appear much contorted, being generally nearly horizontal at the edge of the cliff, and dipping both to sea and inland at various angles. E. of Cloghaunsavaun Castle, where the height of the cliff is about 130 feet, some curious contortions may be seen (see Fig. 3).

West of the castle is a bed of black shale, full of fossils. The two little creeks N.E. and N. of Ross also exhibit some interesting contortions.

On the shore N.W. of Ross some of the lower beds eaten away by the water, have fallen in, and the upper ones, dipping both to sea and inland at low angles, form natural arches, which are called the Bridges of Ross.

* Kelve is a collier's term for impure slaty coal.

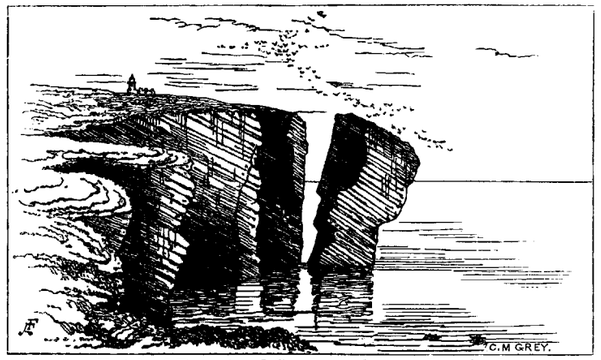
Fig. 3.



On the N. shore of Ross Bay, where the general dip is S. at 75°, the beds are curiously contorted, some of them appearing to assume a concretionary structure on a large scale. All along the shore towards Loop-head the same set of beds are seen, much contorted, but having a general dip N. or N.W. At Blackrock and a mile E. of it, the direction of the coast coincides with the strike of the beds, viz. W. 25° S. and E. 25° N., the amount of dip being from 30° to 70°.

At the N. side of Loop, the dip is W. at 5° to 15°, the rocks being horizontal inland. Here the cliffs are 200 feet in height. Dermot and Granias Rock separated from the mainland by a chasm 25 yards in width at the top, forms a striking object (see Fig. 4).

Fig. 4.



Sketch of Dermot and Granias rock, near Loop-head.

At the S. side of Loop-head, the beds, from being horizontal, are again contorted, dipping S. at 60°, and then becoming horizontal again.

On the shore due S. of the lighthouse and at "Aillnagroagh," this contortion is well exhibited. For a mile east of "Aillnagroagh," along the edge of the cliffs, the beds dip N.W. at 5° or 10°, and then turn over to S. at 60° (towards the sea.) There is a bed of black shale full of fossils half a mile east of "Aillnagroagh;" and near it are some small faults.

Further east, at "Horse Island," the extremity of which is Dunmore Head, the beds dip N. at from 20° to 70°. These contortions are well exposed at the little creek, a quarter of a mile N.E. of Horse Island. From this, all along

the western shore of Kilbaha Bay, the beds dip generally to the N. at low angles, being slightly contorted in some places. Along the north shore the dip is also to the north at 15° to 25°, being again contorted south of Cloghaun Lough.

Eastward as far as Kilcredan Point, a distance of 6 miles from Cloghaun Lough, the general direction of the dip is N. with contortions in several places. For such a distance, a small thickness only is seen, the beds being the same as those seen at and approaching Loop-head.

This is on account of the general direction of the line of coast coinciding with the strike of the beds.

On the shore S. of Carrigaholt Castle there is a section about half a mile in length in highly contorted beds of olive grit and flags, and partings of gray sandy shale. Along the N. shore of Carrigaholt Bay, beds of olive grit and flags dip S.E. and S. 20° E. at from 10° to 30°. Eastward the beds are contorted, and then for more than half a mile dip inland at a low angle. Along this shore some small faults are seen. At and east of Doonaha Battery the beds dip S.E. at 25°, and S. at 35°.

No rocks are seen for nearly a mile east of this, and then as far as Corlis Point, olive grits and flags, and black or dark gray nodular shales traceable along the strike for nearly a mile, dip N. at an average angle of 30°. Some of the flags are ripple marked, and some have numerous tracks similar to those mentioned at Kilkee.

Eastward from this the great amount of local drift conceals the rocks as far as Poulnasherry Bay. For the same reason hardly any rocks are seen inland on the promontory.

S. of Kilkee, near the hamlet of Kilfearagh, a few quarries exhibit beds of olive grits dipping N. and S. at low angles.

S. of Farrihy Lake, and N.W. of Kilkee, some quarries are seen. One in the townland of Farrihy, about one-third of a mile S.E. of St. Brenden's Well, shows olive flags and black sandy shale, dipping S. at 45°. The slope of the hill is also south, and this may increase the true amount of dip.

S.E. of this, in the townland of Carrowbloughmore, a little W. of Knocknagore House, several quarries along the road side exhibit olive grits and flags, dipping N.W. at from 15° to 30°; this being also the direction of the slope of the hill. About half a mile S. of Knocknagore House, on the west side of the road, is a quarry in which are seen dipping S. at from 25° to 35°, olive micaceous sandy shale and indurated clay, with a string of culm a quarter of an inch thick, thinning out to nothing, overlying strong olive grits and *flags*,* with partings of black sandy micaceous shale. Beds, apparently the same as these lower ones, are seen in quarries half a mile further south, on the same road, dipping W. at from 5° to 25°; in the intervening space, upper beds (*i.e.* beds above those last mentioned, and probably the same as those in which is the string of culm,) of olive grit and shale are seen at Kiltinnaun burial ground, and a little south of it, forming a similar synclinal curve, those at the burial ground dipping S. at 20°, while those south of it, dip W. 25° N. at 5°.

At the N. side of Poulnasherry Bay, in the townland of Moyasta, at S. side of the road from Kilrush to Kilkee, are quarries of olive grits and light gray flags, with fragments of plants, and a bed of light gray flag, with imbedded fragments of black sandy shale, forming a kind of breccia; they dip N.W. at 5°.

One mile and a-half east of Poulnasherry Bay, in the townland of Leadmore east, are quarries of olive and gray grits and flags, horizontal near the top of the hill, and on its side near Pella House, dipping S. at 25° to 30°.

In Leadmore West, near the Trigonometrical Point, height △ 68, three quarters of a mile W.S.W. of Pella House, are olive grits and flags, dipping N. 15° W. at 25°. At the N.E. side of the town of Kilrush, on the hill

* Economically these flags are of a superior quality.

called Crag, are extensive quarries of strong olive quartzose grits, and on the surface of some of the beds are marks resembling bivalve shells and plants; these beds dip N.W. at from 5° to 20°. Beneath these beds (although no shale is seen) culm is said to have been got in small quantities, and used in the forges. It is also said to have been found at a depth of 30 feet below the surface, some years ago, in sinking a pump-well at the N. side of Francis-street—near where the National Bank now stands. Beyond this no information can be obtained, as it was never worked. At the cross roads, quarter of a mile E. of the "Crag" quarries, and at Ballykett fair-green are beds of gray and olive quartzose grits and flags with shale partings, dipping at the former place N. at 30°, and at the latter N.W. at 15°. If the coal does exist, these beds are probably above it.

About three-quarters of a mile S.E. of the fair-green, in the townlands of Kilcarroll and Dysert are several quarries of olive grits and flags. One at "Tobercarroll" gives a dip of S. at 25° or 35°, while others S.W. of it show a northerly dip at angles varying from 5° to 35°.

The coast S.E. of Kilrush affords a non-continuous section. On the shore S. of Bellevue are beds of gray and olive grits, flags with tracks and olive sandy shale, dipping S. and S.E. at 5° to 10°. These beds are cleaved, the dip of the cleavage being S. 10° E. at 60°.

At Aylevaroo Point are olive grits, flags with annelid tracks and olive sandy nodular shale, having a general dip of N.E. at 15°.

A little N.W. of Moyne Point, some kelvy coal is seen, the dip being N. at 15°.

The following is the vertical Section.

		Ft.	In.
10.	Black shale with ironstone bands,	over 30	0
9.	Kelve,	,, 0	1
8.	Gray clayey shale full of plants,	,, 0	8
7.	Kelve,	,, 0	5
6.	Kelvy shale,	,, 1	3
5.	Blue shaly clay,	,, 0	9
4.	Olive gray grit, "*seat rock*,"	,, 1	0
3.	Black sandy shale,	,, 0	7
2.	Olive and gray grits and flags, interstratified with black sandy shale,	,, 8	0
1.	Black shale with olive grit bands,	–	–
		,, 42	9

The same beds are exposed about three-quarters of a mile N.E. of Moyne Point, in the stream bounding the townlands of Moyne and Ballymacrinane, dipping N. at 15°. The beds next below those last mentioned are a remarkable set of gray and olive gray flags, having a variety of tracks on their surface, resembling worms in form, like those of Kilkee. Some of the tracks exhibit curious transverse markings. On the upper surface of the beds the tracks are concave, on the under convex.

They are traversed by vertical joints running N.N.E., by means of which they are easily quarried. This facility is also much increased by the want of adhesiveness of the beds to each other.

They are seen at Moyne Point and in the inland quarries near it; and all along the shore of the townland of Carrowdotia South, S. of Carrowdotia House, they form a synclinal curve, at the shore, about half a mile W. of Carrowdotia House they dip S. at 10° to 30°, becoming horizontal nearly due S. of the house, and then at the "Flag Slate Quarries," dip N. at 15°. These flags are sold at 1*s.* 2*d.* or 1*s.* 3*d.* per square yard; 8 feet by 2 being here considered equivalent to that measure. At present these quarries are not extensively worked.

The hills N. of St. Senan's Lough, and S. of Cooraclare, almost all exhibit olive grits and flags, dipping N. and S. at various angles. All the beds of shale have been denuded; their soft nature not enabling them to withstand the wearing action as the harder grits did. A tolerably good section, in con-

torted beds, is to be seen three-quarters of a mile N.E. of Kilrush, in the ravine, in the townland of Ballykett, the flags showing tracks and plants.

The rocks on the south side of the Shannon must now be described.

For half a mile N. of Leck Point (west coast) are seen a series of strong olive grits and flags with shale partings, dipping to the N. at from 15° to 30°. At this distance, the angle increases, the dip being N. at 50°, and as far as the "fort," called *"Dermot and Granias bed,"* less than half a mile S. of Kilconly Point, it varies from 50° to 70°. Then for about one-fourth of a mile are seen contorted beds of grits and thick black shales, and then as far as Lissadooneen Fort, *burial place of a ship's crew*, a distance of about three-quarters of a mile, in a direction perpendicular to the strike of the rocks, there is a tolerable steady dip to the S. of from 45° to 60° or 70°. N.E. of Lissadooneen Fort, for a distance of half a mile along the shore, the beds are much contorted. The strong olive gray grits at the S. side of Lissadooneen Fort, are the lowest beds seen in the section, and are probably not more than 1,000 feet above the limestone. This is calculated by continuing this section to Ballybunnion, in Sheet 151.

Eastward, both inland and along the shore, the great accumulation of local drift and other superficial covering conceals the rocks. At Corran Point, at the N.W. of Carrig Island, are thin olive and gray rippled grits and olive shales, dipping E. and S.E. at 10° to 15°; under the battery they are horizontal.

On the shore of the mainland, N.E. of Killelton, are similar beds dipping N. at 30° to 35°.

N. of the village of Ballylongford, at the W. side of the creek, is a quarry of gray and olive flags with partings of black shale, dipping S. at 25°.

East of Ballylongford Bay, at Knockfinglass, and Ardmore Points, are olive gray flags with tracks and olive shale, dipping N.W. at 25°. East of Ardmore Point these beds are much contorted. Some of the tracks are of considerable size, and exhibit a central groove, generally sparkling with mica.

6. *Superficial Covering—Bog, Alluvium, &c.*

The inland portion of the tracts of land at both sides of the Shannon are covered over to a considerable extent by the local drift of the coal measures, and here and there are occasional fragments of limestone and blocks of syenite. Scattery Island and Hog Island are completely covered by local drift, consisting of clay, gravel, and fragments of coal measure grits, with occasional boulders of limestone; the latter are common everywhere amongst the shingle on the beach.

About one mile west of Kilcredane Point, on the shore of the townland of Rahona West, is a bog with stumps of trees standing erect; it is between high and low water marks, and above it is a layer of yellow gravelly clay containing recent marine shells. The stumps of the trees have a charred appearance.

An extensive tract of bog lies to the north of Poulnasherry Bay, which has been largely used for several years as the principal source of the supply of turf for the neighbourhood, and even for the city of Limerick.

On the shore near the hamlet of Ross, and also near Kilcredane Point, where the local drift has been removed, parallel striæ or scratchings, having an E. and W. direction, are observable on the surfaces of the rocks. They probably result from glacial action.

Along the shingly beach of the Kerry shore, limestone boulders are numerous, and there are occasional blocks of syenite. West of Cloonaman Point, just above the shingle, is a remarkable recent conglomerate of pebbles cemented together with sandy (calcareous?) clay, overlying a peaty formation consisting of woody fibres and branches of trees.

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