
EXPLANATION

TO ACCOMPANY

SHEET 105, WITH THAT PORTION OF SHEET 111

THAT LIES ON THE NORTH OF GALWAY BAY,

OF THE

GEOLOGICAL SURVEY OF IRELAND.

BY G. H. KINAHAN, M.R.I.A.

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Combined memoirs on particular districts will also eventually appear.

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A 2
EXPLANATION

SHEET 40, WITH THAT PORTION OF SHEET 114
THAT LIES ON THE NORTH OF GALWAY BAY
OF THE
GEOLICAL SURVEY OF IRELAND.

LIST OF ILLUSTRATIONS.

1. Diagrammatic sketch, showing peculiar foliated beds of grés in granite. 740
2. Plan of county of Galway. 84
3. Plan showing peculiar oblique foliation. 40
4. Sketch showing peculiar crumpled foliation. 40
5. Oblique foliation. 40
6. Section in a gravel pit at Kilbarriff. 44
7. Sketch of boulders of rocky boulder drift on the north slope of Sliever trough. 49
8. Plan and section of Coolehi hole. 50

General Description.

The principal place of note in the area contained within the limits of this sheet of the map, is the town of Galway, on Galway Bay and the River Corrib. The latter is the small river through which the waters of Lough Corrib, the second largest sheet of fresh water in Ireland, find their way to the sea. Further west, on the same seacoast, are the villages of Banna and Spiddal, while seven miles N.W. of Galway is the village of Moycullen, and extending northward a few miles north of Galway, is the lower or south part of Lough Corrib.

1. Form of the Ground.

The road from Galway to Oughterard, Tar-Connamara, and the country to the north-west, runs in a nearly north-west line from Galway, dividing the area contained within the limits of this sheet of the map into two parts, which are remarkably dissimilar, that to the east on both sides of the south part of Lough Corrib being low, and comparatively speaking flat, while the country on the

The ancient name of this river is said to have been Calbus, from which the town built by the English colonists in the thirteenth century was named Galway, the latter part of the name being considered to be Latin. Previous to that time there was a castle called Colsean, on the same site. The name Lough Corrib is derived from the Irish, Lough-Coire, meaning a lake or a stretch of water. This name is to be found on every map of the district.

The surface of Lough Corrib is twenty-eight feet above the sea and this part of it is found on a reference to the chart published by the Admiralty, to be very shallow, at the south extremity of the lake being about eight feet deep. From here it gradually increases in depth, first being about twenty feet deep and then gradually increasing to eighty feet at the head of the lake. The lake is about six miles wide at its greatest part and is about twelve miles long. The channel is the most advantageous place to cross the lake. North of this channel the depths are very irregular, varying from two to ten and twelve feet as far
west and south-west is wild and hilly; a ridge of high ground extends from Galway north-westward, and afterwards westward, the highest peaks being Killargung. 471, S.W. of Moycullen; Leatleter, 467; Newtownhall, 654; Knocknarry, 660; Donore, 698; Knock- 
seas, 872; Knockanecky, 965; Shanmara, 743; Seacoe, 922; Knocklesteraffrane, 908; Derrada, 555; Knockavannahmore, 704; and 
 Shanashpellteen, 740; a little westward of Seecom Lough. From this 
high rise of land the slopes tend toward the east, suddenly at 
first, and afterwards more gradually to Lough Corrib. On the north 
its high gradient from the valley of the Vough river or Owenniff, 
while southward is undulating and very gradual to Galway Bay; 
however, there are numerous hills rising in this slope, their altitude 
usually becoming less the nearer they approach the sea. The low 
land in the neighbourhood of Lough Corrib rarely exceeds 160 
feet in height, its average being about fifty; on the west of Lough 
Corrib, however, and N.W. and north of Ross lake, there are range 
of ground 154 and 113 feet, and on the S.E. of Lough Corrib overlook-
ning the Marble Quarries, is a hill 220 feet, and further S.E. north of 
Mollin Park, another 214 feet. 

The drainage of the low country and of the valleys in the hills that 
open towards the east and north belongs to the Lough Corrib basin, 
while the southern slopes of the hills are drained by numerous 
streams that flow into Galway Bay, the largest being the Bolika, 
that empties itself at Spiddie.

On the east watershed of the Bolika there is a remarkable lake, 
called on the map Slieveeenena Lough, which has two outfalls, one 
being into this river basin, and the other eastward into that of Lough 
Corrib.

Adjoining the south end of Lough Corrib are extensive alluvial 
data which seem formerly to have been part of the lake, but sub-
sequently were filled up with all and peat.

\[\text{north as Gallachaeidich island, north of which is a place marked twenty three feet,}
\text{while no water exceeds nineteen feet—Inner Boys north not exceeding fourteen or six-
\text{teen feet. The short from which these depths are taken was made previous to the navigation 
\text{wells; those latter lowered the summer level of the lake thirty feet. The river 
\text{from this lake to the sea is recorded four times during the historical period as having 
\text{slightly gone dry—namely, in the years a.D. 1178, 1190, 1647, and 1685. I have 
\text{tried to account for these sudden droughts in a paper, "On the Emanation of the 
\text{Rock Raft of Lough Corrib." (see "Geological Magazine for November, 1860." )
\text{As nearly all the names in this district are Irish or corruptions of the Irish, per-
\text{haps it would not be out of place to give the English of some of the Irish words that 
\text{are continually being met with, more especially as the same may be useful in 
\text{meaning joined together, as for instance, "Owenniff river," the English of "Owen- 
\text{niff" being "Owen-fye," the Irish "Owen.""

Grain.—The name of this district may be divided into three 
\text{kinds, which will be spoken of under the names of Intrusive Granite, 
\text{Foliated or Stratified (?) Granite and Porphyritic Granite; more-
\text{over there are varieties of the latter, one being a granite in which 
\text{none of the minerals are developed in large marked crystals, but 
\text{apparently its constituents are similar to those of the Porphyritic 
\text{granite, the other varieties will hereafter be described.

Intrusive Granite.—This kind of granite occurs in tracts, courses, 
\text{veins, and pipes among the metamorphic sedimentary rocks; it also 
\text{occurs in places in the Porphyritic granite, and the Porphyritic 
\text{foliated granite, but usually near the margin of the mass. When 
\text{in veins it generally seems to be a compound of foliar, granite, and 
\text{a greenish mineral that may be a green mica (lupideranum?) or 
\text{perhaps an earthy chloride; and this last-named mineral also 
\text{often occurs in bands and lenticular patches. The silex ap-
\text{parently is in greater excess than in the Porphyritic granite and its 
\text{varieties. In the tracts and wide courses the granite usually 
\text{always is micaceous, having black micas in place, also white mica, 
\text{and iron pyrites as essentals, and sometimes being so allusive as to look 
\text{like a quartzite. Sometimes this class of rock becomes Pyromonite, 
\text{when Snapelle seems to replace part of the whole of the foliar; at 
\text{other times it loses its foliar and becomes Gresieon, "a crystalline 
\text{granular compound of quartz and mica."} from which in some places 
\text{it seems to become Quartzite; however, this may be only apparently,}

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**" Rocks classified and described." - B. van Cotta. / LAVENROE's TRAFF. Page 227."**
as the mica may be in such minute flakes as to be nearly invisible. On the other hand, it seems to lose its quartz, mica, &c., and become foliate rock, a rock of compact texture about the hardness of felspar, with dull or smooth conchoidal or fissile fracture, colour yellowish, reddish, grey, greenish, or bluish, weathering white."

In its conspicuous accessories are galena, copper pyrites, barytes, calcite, and fluor spar, which often occur in geodes, nodules, lenticular patches or drusy cavities that are lined with crystals of quartz. The chlorite (blue paste) appearing in the rock seems also to indicate the presence of those accessories, as also pockets of iron pyrites. A peculiarity of this granite is a structure that at first sight has the appearance of an obscure foliation, and yet it can scarcely be so called, as the constituents of the rock do not appear to have a tendency to occur in layers. It is only conspicuous when the rock is weathered, and usually is more prominent in the tract and courses than in the small veins. Perhaps it might possibly be a close irregularly-parallel jointed structure, introduced during the cooling of the rock.

The usual constituents of the Phosphoritic granite appear to be pink, or flesh-colored and white felspar (Orthoclase), green felspar (Oligoclase), black mica, and quartz; while the following seem locally to be constituents—hornblende, sphenane, a green mineral that may be a mica, or perhaps an earthly chlorite, as suggested by Professor King, of the Galway College, a white felspar, epidote, iron pyrites and white mica; however, in other places these seven minerals seem only to be accessories, to which may be added copper pyrites, galena, fluor spar, and garnet; while others may also occur, but were not particularly noted. The orthoclase occurs usually in large crystals often twinned, some of which are two inches in length, and in places some of those large crystals of orthoclase of a pink colour are enclosed in an envelope of a white felspar. The green mineral is usually disseminated through the mass, but often it occurs in pockets and irregular segregations. The hornblende, when an essential of the rock, is nearly always accompanied by sphenane, and sometimes by the greenish mineral, or by epidote. In places there are irregular patches or veins of a variety that is "very coarse and irregularly constituted of orthoclase, quartz, and silvery white mica," answering Cotta's description for Pegmatite. Professor Melville, &c., recognized some of the mica in Pegmatite north of Furbo as Margarolite.

In some localities most of the felspar crystals in this variety are two inches or more in length. Veins of a compact variety, which may, perhaps, be called Erbo, a fine grained crystalline aggregate of quartz, felspar, and micas, where the latter is often in such minute flakes as to be invisible to the naked eye, varying from half an inch to four or five feet in thickness, occur generally in these granites. On the south of the Porphyritic granite, near the seaboard of Galway Bay, the granite is generally unevenly grained, rarely porphyritic, and this kind seems to extend in "courses" into the Porphyritic granite. It also seems to be divided up into courses of different varieties, some courses having similar essentials to the Porphyritic granite, while in many there are as constituents, white or pink felspar, quartz, and black and white micas, with as accessories, iron and copper pyrites, green felspar, and rarely hornblende, titanite (phosaphane), galena, calcite, fluor spar, garnet, &c. Another variety was remarked, in which the essentials seem to be white felspar, hornblende, sphenane, black mica, iron pyrites, and quartz, with white mica, copper pyrites, &c., as accessories. Perhaps it should here be observed that among these varieties of the vicinity of Galway Bay, there are many courses of the supposed metamorphic foliated igneous rocks (page 11). The varieties of these granites, as before remarked, seem to lie in courses, and what is perhaps more remarkable, in one place where geese overlies them the dip and strike of the courses seems to be similar to that of the beds of the overlying gneiss.

It usually happens that in hand specimens, or even large pieces of the Porphyritic granite, no foliation is perceptible; but on looking at a still larger expanse of the rock, the large crystals of felspar are found usually to lie in irregularly parallel lines, and, as followed northward and north-eastward, this structure becomes better developed, until the rock gradually becomes a Porphyritic foliated granite. The last named seems to have similar essentials and accessories to those characteristic of the merely Porphyritic granite, but the mica and chlorite, &c., for the most part are arranged in layers, giving it a gneissic aspect; moreover, the large pink crystals of felspar generally are dispersed rudiately parallel to the layers of mica. It is, however, not unusual to find some of these crystals cutting across the layers of mica, and it was not remarked in any place that the leaves of the latter occurred bending round them. It should be mentioned that no undisturbed bedding was observed, only foliation. The Porphyritic granite not only passes gradually into the Porphyritic foliated granite, but the latter sometimes gradually loses its porphyritic character, and seems to pass into gneiss and schist. Moreover, when it passes into an hornblende gneiss apparently it is impossible to point out where the Foliated porphyritic granite ends and the gneiss begins, unless a few beds of schist occur in the latter.

Dr. Haughton, of Trinity Coll., Dublin, as mentioned in a resume of his conclusions on the granites of Ireland, and published by Professor Smyth,* believes them to belong to three classes, viz. —1. The granites of Leinster. 2. The granites of Munster and Carlow-fat; and III. The granites of Donegal, Mayo, and Galway. The first are quartzary granites, composed of —1 Quart; 2 Orthoclase; 3 Madderite; 4 Lepidolene. The second are quinary granites, composed of —1 Quartz; 2 Orthoclase; 3 Albitie; 4 White Mic (Mardarite?); 5 Black or green Mica (Lepidolene)-; and the third are also quinary granites, but their constituents are —1 Quartz; 2 Orthoclase; 3 Oligoclase; 4 Margarolite; and 5 Lepidolene. Of this third class of granites he says—"They differ from the granites 1 and II. in being stratified, and not intrusive, and therefore vary considerably in different locations according to the beds from which they have been formed by the metamorphic action."

blackish colour. They have from an uneven to a backy fracture, compact, although at the same time easily broken into small fragments on account of their reticulated structure, which seems to be pure rutilus parallel to the walls of the dykes. In some there is a submetallic glistening lustre, while others are dull, and all seem to be opaque. Before the blowpipe they melt on the edge into globules with greater or less facility.

The Diabase vary from a pale to a dull greenish colour, from fleshy to granular, of a submetallic glistening lustre with an uneven fracture. Before the blowpipe it fuses easily.

Felsites and Greenstones probably Metamorphic.—The igneous rocks, which are supposed to have been affected by a subsequent metamorphic action, are both Hornblende and Felaphic. Excepting the compact varieties of the Felaphic class these are usually highly crystalline, inclined to be porphyritic.

Hornblende Rocks.—These generally are not found among the granites, but among the metamorphic sedimentary rocks they occur near the Carboniferous period, the second being similar to those found associated with rocks of Carboniferous age, and the third to those found among the older Palaeozoic rocks. The division in the Felaphic rocks are not marked; one kind, however, seems to be compact and to have a fracture from smooth to conchoidal, while others are of a splintery or granular nature, and break with an uneven to a backy fracture; moreover, in these quartz globules are not unusual. The former seem to be nearer to the latter, but no conclusive proofs have yet been found. In this district they appear to be the two classes of the Felaphic rocks, while of the Greenstones there were only remarked those supposed to be Diorite and Diabase. However, some of those supposed to be Basaltic, may possibly occur, as they were remarked a short distance west of the district, F. and PP. (Felsites and Porphyrites). In colour these are usually black, greenish, or grey. In some there are white crystals of felspar thinly scattered in the matrix, while in others the crystals become so numerous as to change the rocks into porphyry. Those that have an even to a backy fracture are usually compact, with an impachable structure, and subtranslucent; while the varieties that have an uneven to a backy fracture are usually compact and translucent to subtranslucent; the latter in places are scarcely distinguishable from the slightly altered portions of the supposed Metamorphic felaphic eruptive rocks. In places the felaphic rocks may be in part dioritic, as before the blowpipe they fuse on the edge, although in them globules of quartz disseminated through the mass were detected. Minute and flying dykes of compact felsite rocks come up in places through the cracks and joints in the granite.

D. (Diorsie and Diabase). The first are of a dark green, inclined to
Among some of the granites are dykes of a hornblende rock that seems to be intrusive, but at the same time foliated and of a schistose gneissic aspect. This rock consists chiefly of leaves of hornblende, quartz, and felspar, but in some places the quartz seems to be absent, and in others mica appears as an accessory. The foliation usually is parallel, or nearly so, to the walls of the dykes.

The supposed metamorphosed felspathic intrusive rocks are of various textures and compositions, most of them however may petrologically be similar, as they seem to change imperceptibly from one lithological variety to another. They occur in tracts, courses, pipes, and dykes in the metamorphic rocks, and also in the granites, excepting the intrusive granite, which seems to have been subsequently irrupted. Foliation occurs in various places among the granites, usually they may be some of the more modern intrusive rocks, but in some places it seems highly probable that they are metamorphosed. These latter varieties consist of Striped Peltosis, composed of thin layers of somewhat dissimilar texture and colour, hence the fracture appears to be striped like a riband, and the rock splits more easily in the direction of the layers than straight across. The layers are often much bent and twisted.

This rock often contains globules of quartz, and changes into the rock Quartziferous Peltosis.

There are strong currents of Quartziferous Peltosis, a rock in which the matrix is compact throughout, often dark coloured (green or blue), and contains separate crystals, globules, and laminae of Orthoclase, sometimes Oligoclase, quartz, and mica. Much of the quartz is in globules; on the outside of some the crystal faces can be recognised, but most of them are regular minute balls. Some of these have an internal stellated structure, in which case there is often a minute hollow in the centre. These globules are usually scattered through the mass, often very sparingly, but in places they are so numerous as to give the rock a pisolitic appearance. This rock seems to change into a variety that has a “matrix resembling granite, but distinct crystals of Orthoclase, Oligoclase, globules of quartz, and also laminae of mica are separately and prominently developed.”

This latter rock usually loses these characters gradually, and becomes indistinguishable from the associated granite. In some of these rocks many of the Orthoclase crystals (pink) are enclosed in an envelope of light green Oligoclase, similar to those in the rock that has been called Hapakivi granite. There is also a dark

* If these are metamorphosed igneous rocks, it would not appear at all improbable that in places they might be altered, while in others that they might be almost changed into a granite. In cases where the rock is altered, it is in the last case they would be altered. If all the altered rocks are metamorphic, the igneous rocks would be of the same nature as the granite, excepting in the latter they would be altered.

** This and the following rock possibly may be unaltered rocks, in which case they should be described among the foliates. In places, however, they seem gradually to change into a rock with a granite aspect.

† Called by Cotta Striped Peltosis, Cotta, Page 317. A varieties variety of foliates, called by Cotta, “Horizontale,” was observed in some localities, but as it is more probable an altered igneous rock, it is not fitted among the igneous rocks.

‡ Cotta’s description of a rock that he calls “Granitic Granite Porphyry.” Page 312.
Limestones usually are peculiarly constituted, being rarely evenly laminated, but generally having a concentric or curled, spheroidal, curved, or lenticular structure, or, perhaps, all combined; therefore, as the foliation seems to follow the most marked structure in the original rocks, the foliation in metamorphic limestones ought to be peculiar. In this district, usually it is most complicated, rarely being parallel to the bedding, but more often being concentric, curled, or nodular, and crumpled or wavy, or perhaps all combined.

In some shales, and more rarely in gristy and sandstones, the structure is spheroidal, while in others there are enclosed masses of foreign substances, round which the lamination of the rock curves, giving them a nodular structure.* Besides, in other shales, there is a wavy or crumpled lamination, that does not coincide with the planes of stratification.† And apparently, it is in these structures in the original rocks which seem to have introduced the complicated kinds of foliation in the metamorphic rocks. Some of these nodules are very irregular in shape, being twisted and contorted, while others have the appearance of veins, more especially when they are of a granitic aspect. However, that these vein-like portions have not been injected into the rock, seems proved by their all being (although some are so irregular) lamellar masses, that is, dying out every way and then being enveloped in the mass of the rock. Moreover, that they are due to the metamorphic action, which, by some process, has separated their constituents from the others in the rock mass, and that they have not been portions of previously existing rocks floating in a half melted and semi-fluid mass, would seem to be proved by their occurring as frequently, if not often, in the limestone as in the other kinds of rock. Some of the metamorphic sedimentary rocks are conglomerates, containing large and small blocks, sometimes sparingly scattered through the mass, but often thickly together, the matrix being sometimes granitic, but more often schistose. When the nodules are few usually they are very similar in their constituents, and appear to be due to a nodular structure in the original rock, but when they are numerous the rock seemingly is a metamorphosed conglomerate, as the enclosed blocks may be of quite different characters. In this district in the neigh-}

...
occur being a few dykes of the hornblende gneissic and schistose rocks, while none of the masses, tracts, &c., of the other supposed Metamorphic hornblende intrusive rocks occur; and might not this be naturally looked for, as the Hornblende rocks should melt with much less heat than the Foliate varieties, and therefore disappear, being incorporated in the granite? Moreover, in the Porphyritic granite there are tracts and courses in which hornblende, sphenite, chlorite, and epidote, separately or combined, seem to become essentials of that rock; and it is not possible that such places point to localities in which Hornblende igneous rocks originally existed.

Courses, dykes, &c., of the supposed Foliate metamorphic intrusive rocks are as frequent towards the margin of the mass of the Porphyritic granite, as in the metamorphic sedimentary rocks, but they do not occur among the Intrusive granites; moreover, when they are followed into the mass of the Porphyritic granite, as before mentioned, they disappear, seemingly having been absorbed into that kind of rock. From this might it not be possible that at first they resisted the metamorphic action better than the associated sedimentary rocks, but when the force of that action became too strong they also succumbed, and eventually disappeared in the granites? In some places this change seems to be quite perceptible, as the rocks appear gradually to lose all the globules of free quartz, and change into a granite.

Dykes, and courses of gneiss-like rock occur among the granitic and the metamorphic rocks. If these were injected among the different kinds of rocks, from whence have they received their present foliated structure? But if they were dykes of igneous rock in the original sedimentary rocks, might not the foliation have been introduced at the same time as when the associated rocks were metamorphosed? In many igneous rocks there exists a structure sometimes, but not always, nearly parallel to the walls of the dykes; and, as previously observed, the foliation is often, although not always, nearly parallel to the walls of the dykes or courses; therefore might it not be probable that the lines of foliation in the latter rocks followed lines of structure in the unmetamorphic rocks?

In many of the granites, and in the supposed metamorphic igneous rocks, more especially in the hornblende varieties, there are hard parts that weather out in raised lines. These seem to have been caused by some kind of structure in the original rocks. In the hornblende varieties they are quite compact, while in the foliated varieties, and in the granites, there is some sort of structure in the original rocks. In the granite and the foliated rocks, when viewed from a distance, these lines have all the appearance of joint systems in ordinary intrusive rocks; while those in the hornblende rocks have a combination, partly being like joint systems, and partly having the appearance of imperfect columnar structure. As the latter often are very prevalent in some hornblende igneous rocks, and joint lines occur in all igneous rocks, may it not therefore be possible that among the granitic and foliated rocks the vague, either wet or dry, charged with silicic or some such substance, coming up through the joints, hardened the adjacent parts of the rock; while in the more easily melted horn-
blendic rocks the joints and other lines were not only hardened, but also fused, and thereby the open lines closed? What seem to be these old joint lines previously mentioned, also occur in the Metamorphic sedimentary rocks.

AQUEOUS ROCKS.

d. Carboniferous Rocks.—These consist principally of dark gray and blue bedded, parallel-jointed limestones, with here and there a few beds or partings of shale; and in some places, nodules, lenticular pieces and layers of chert are frequent. Where the limestones approach the older rocks on which they lie unconformably, there is often a structure allied to oblique lamination visible, in some cases it being undoubtedly that kind of structure. When the limestones appear under these conditions, they usually have interstratified with them fine limestone conglomerates, the enclosed pebbles being small particles of white quartz. At the junction of the limestone and the older rocks, a brecciated conglomerate was observed; and in one place there seems to be good yellow sandstone. Styletites which consist of irregular and longitudinally striped cylinders, standing at right angles to the rock's stratification, and often ended abruptly (Cotta), are not unusual in the limestone in the east part of this district.

The Drift and other superficial deposits will be mentioned in the Detailed Description.

3. Relations between the Form of the Ground and its Internal Structure, with some Account of the latter.

The low country in the neighborhood of Lough Corrib, and N.E. and E. of the town of Galway, has everywhere rocks of the Carboniferous period under it, usually being limestones, but in a few places there are thin shales, and there may be a few sandstones and conglomerates; while the wild hilly country west of Galway, and south-west of the road from Galway to Oughterard, is composed of granitic, irruptive, and metamorphic rocks. The limestone country is usually more or less fertile; however, in places there are extensive bogs and alluvial flats, and in others, large crags, where the rocks come to the surface, being destitute of an envelope of either Drift or vegetable mould. In the hills, the country over the metamorphic rocks is also to a degree fertile, often producing good mountain pastures; while the granite ground nearly always has an envelope of bog; in some places however, there is a coating of Drift, which, by cultivation, can be made fertile; moreover, some of these hills produce a coarse pasture, and the inhabitants, by perseverance and industry, have brought parts of this wild country into cultivation, more especially in the neighborhood of the seashore, where they principally reside, on account of the facilities for fishing and collecting marine marine, besides the cutting of turf for shipment to Galway. That the granite and metamorphic rock country was once partly or entirely covered by the rocks of Carboniferous age would seem suggested by small patches of brecciated conglomerates, similar to the shore bed of that group, having been observed in detached places. It may here be observed, that the axes of the curves of elevation that forced up the metamorphic rocks, soon to have a N.W. and S.E. bearing, while similar areas in connection with the Carboniferous rocks, and the underlying conformable sandstones, slates, and shales, called the Old Red Sandstone, in the centre of Ireland, bear N.E. and S.W., or nearly so.

Detailed Description.


In this section of the memoir it is proposed, first, to describe the Carboniferous rocks, and afterwards the granite and metamorphic rocks.—the Drift alluvium, &c., also the mines and minerals, being reserved for separate sections. For convenience the area may be divided into six districts, namely — I. The limestone country on the east of Lough Corrib, or the Annaghdown District; II. The limestone country on the west of Lough Corrib, or the Ross District; III. The limestone country lying N.W., N.E., and E. of the town of Galway, or the East Galway District; IV. The metamorphic rock country in the vicinity of, and N.W. and W. of, the town of Galway, or the West Galway District; V. The wild hilly country N. of Galway Bay, or the Athenry and Mespilus District; and VI. The Rocky Lough District, a strip of hilly country between Ross Lake and the N.W. corner of the map. The first three are part of the country of the Carboniferous rocks, and the others of that in which granite and metamorphic rock occur.

Carboniferous Rocks.

I. Annaghdown District, or the limestone country east of Lough Corrib.—East of the south part of Lough Corrib, in the neighborhood of the Cong and Congaway rivers, is a large alluvial flat and bog, and on the north border of this flat, south and west of the hamlet called Barrown, are dark gray, and blue jointed limestones that dip S.E. at 5°, or lie nearly horizontal. Further north, in the neighborhood of Woodstock, they nearly the same dip was observed; however, there is a broken crenellation immediately northward of this place, and a mile on the N.E. west of Lough Aher there is a more extensive crenel, in many places covered with rock debris; however, or rocky drift. Surrounding Lough Aher, within a mile radius, there are numerous detached fragments and small exposures of dark grey or blue limestone in which the rocks lie nearly horizontal, or have a slight dip towards the south, or south-eastward; west of the village of Annaghdown, in the vicinity of Culhamore Wood, are similar rocks all nearly horizontal; and in the strip of country extending from Annaghdown to Kilnaboy, between Lough Corrib and the bog, are numerous small crenellations, the rock being nearly horizontal, but with a slight dip to the southward, or south-eastward.

Further east, between Kilnaboy Mills and the Roman Catholic chapel, the lie and dip of the rocks is irregular, in the vicinity of the chapel they lie horizontal, while farther north, in the neighborhood of the trigonometrical point Δ 57, they dip westward at about 10°, and between this place and the road they dip southward at 3°, a little more north they have a N.W. dip of 5°, but farther north they are horizontal, and in the vicinity of Kilnaboy Mills they have a slight southerly dip. In the strip of country north of Ballindred Bay there are some extensive crenels partly covered with rock debris or rocky drift; the rocks are much jointed and all seem to dip southward at about 3°.

II. Ross District, or the limestone country west of Lough Corrib.—Immediately west of Lough Corrib, and at the extremity of the promontory south of Ower Bay, there is a nearly horizontal crenel of dark grey or blue lime-
stone that seems to be nearly horizontal; however, a great part of it is covered with rock debris or rocky drift. In the neighbourhood of Portdar- ragh and Tullikenny, and from that to Goreyhall, there are small crevices or rock exposures that lie nearly horizontal, or have a slight south dip; moreover, northwards, in the vicinity of Gorey, Kilcock, and Wexford, there are small crevices and rock exposures, the rocks being nearly horizontal, or with a slight southwest dip; there is also a north and south mineral lode, of which a full description will be given elsewhere. Similar rock exposures will be found still further north in the neighbourhoods of Blennow and Clonmel.

Eastward of Clonmel, and extending eastward, southward, and westward, from the hamlet called Gortnettraugh, for a considerable distance, it is a wild expanse of limestone that is covered with rocky drift or rock debris; all the rocks having a southward or south-eastward dip, at angles varying from 2° to 10°. North-west of Gortnettraugh in the vicinity of Knockbouhna the rocks are very cherty. Further west and north-west of the hamlet called Killarneyighter, on the junction of this district with that contained in Sheet 95, in the townland of Moyvane, there is a nearly N. and S. lode sealing lead.*

In this part of the district, more especially north of Killarneyighter and N.W. of the old church, the limestones are oblique laminated and in some instances slightly conglomeratic, containing minute particles of white quartz and other foreign rocks; there are also, near the boundary of the metamorphic rock, angular blocks and slabs of conglomerate and sandstone, that seem to be near the parent rock; however, on account of the deep Drift horizons, in no place were rocks of this class observed in situ. The rocks hereabouts dip S.E. or E. at a very low angle.

Farther north-east, west of Ross Lake, and immediately N.W. of the hamlet called Coulogh, incorporated with, and lying against, a granite cliff, is a coarse brecciated conglomerate, part of one of the shore beds deposited between the older rocks and the Carboniferous limestones.

All along the boundary between these rocks and the Carboniferous limestones, blocks of this brecciated conglomerate may be observed, and close to the village called Newtown, about a mile S.W. of the last locality, there is a piece of it exposed in situ, also, in the stream a little S.W. of Drummon House, and another in the wood on the west of the road due south of the same house.†

In this neighborhood between Ross Lake and Danesfield, the rocks have a decided dip away from the older rocks of 3° (towards the E. or N.N.E.); but it only lasts for a short distance, as, at a quarter of a mile from the boundary, the limestones are either horizontal or have a dip to the south-east. In the country S.E. of Ross Lake the rocks seem to lie in nearly horizontal undulations; however, in many places they are covered with rocky drift or rock debris. East of Halfmoon Lough the rocks lie nearly horizontal, while west of it they dip away from the older rocks (to the N.N.W.), at angles varying from 3° to 5°, and blocks of the brecciated conglomerate were observed, but not found in situ. In the Longbridge River there is a section showing the limestones within 100 feet of the granite; however, there may be room for between 5 to 10 feet in thickness of a shore rock, and that it may exist seems probable, as loose blocks of it were observed.

III.—East Galway District, or the Limestone Country N.W., N., N.E., and E.

* The details about this lode will be found in the specimen description of the district contained in Sheet 96 of the Geological Map of Ireland, among the East Outward Bore and Lode.

† Meanwhile, other smaller patches of this brecciated conglomerate will be mentioned that occur in different places on the north shore of Galway Bay.
This section was measured near the centre of the quarry. The limestone beds thicken as they are followed to the south end of the quarry, and the shale beds thin; the colour also of some of the beds changes. The column in the St. Augustinus Chapel, Galway, were cut out of stones raised in bed No. 1.

A mile N.E. of Terrybueen quarry and about half a mile S.W. of the old castle of Bollindie is a small quarry that has been opened on a stone good for tool work, of a light grey colour. Magnesian limestone was remarked in Menloagh Woods, south-east of the castle. A little N.W. of the village of Tawnieditch there is a line of quarries, out of which a coarse marble is said to have been mined. A very pyritic slate was remarked here, and in it was found a flattened carbonized stem of a jointed plant (like a Calamite), 1.5 inches wide, and over a foot long. Some of the limstone horizons are slightly magnesian.

In the neighborhood of Tawnieditch the rocks, dark grey and blue limestones, are nearly horizontal, but have a slight dip to the south; while further S.W. in the vicinity of Lethevarna there is a slight dip to the east. To the S.E. of the last village the dip is to the S.E. and further S.E. at Martin Park it is N. and N.E., and along the coast of Galway Bay the limestones lie horizontal, or have a slight dip to the N.E. Near the east end of Lough Atalia, in the vicinity of Rinmore House, there are dark blue limestones that have a slight dip to the east; and in the yard of a house on the west of Eyre's square, immediately south of the new National Bank, there are grey limestones that seem to be in situ.

Joints in the Limestones—Systems of parallel joints are prevalent in this limestone, and in the following table a list of some of the most conspicuous. The first column records those between W. and E., the second those between the N.W. and N., the third the N. and S., the fourth those between the N. and E., the fifth the N.E. and E., the sixth the N.E. and W. and E., the seventh the N.E. and W., the eighth those between the N.E. and E., the ninth the N.E. and W., the tenth those between the N.E. and E., the eleventh the N.E. and W., and the twelfth the W. and E., respectively. Among the joints in the second, third, and fourth column the master-joints will usually be found—they are also best developed—while the others are often continuous only for a short distance, and seldom cut through more than one or two beds of the limestones.

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<th>Between N.W. and N.</th>
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Gravels and Metamorphic Rocks

IV. - West Galaxy District, or the Metamorphic Rock Country in the vicinity of and S.W. and W. of the Town of Galaxy. - The principal rocks in the area are metabasaltic sediments such as ultramafic schists and gneisses, and associated with them are granitic veins, coves, and small sheets. These veins also occur to the west of older intrusive rocks, as will be further mentioned.

On Mount Atlas, which lies south of Galaxy town, are gneisses and schists, which occur in several places, and in which the schists are usually more than 200 feet thick. In the rocks of the main mass, there are large quartz and felspathic veins, the latter occurring in the rocks of the north side of the town. The schists, which are present in the area, are usually thin, and in places occur in a series of small veins, the larger of which are usually more than 200 feet thick. The schists are often associated with granitic veins, which occur in the rocks of the main mass, and in which the schists are usually more than 200 feet thick. The schists are often associated with granitic veins, which occur in the rocks of the main mass, and in which the schists are usually more than 200 feet thick. The schists are often associated with granitic veins, which occur in the rocks of the main mass, and in which the schists are usually more than 200 feet thick. The schists are often associated with granitic veins, which occur in the rocks of the main mass, and in which the schists are usually more than 200 feet thick. The schists are often associated with granitic veins, which occur in the rocks of the main mass, and in which the schists are usually more than 200 feet thick. The schists are often associated with granitic veins, which occur in the rocks of the main mass, and in which the schists are usually more than 200 feet thick. The schists are often associated with granitic veins, which occur in the rocks of the main mass, and in which the schists are usually more than 200 feet thick. The schists are often associated with granitic veins, which occur in the rocks of the main mass, and in which the schists are usually more than 200 feet thick. The schists are often associated with granitic veins, which occur in the rocks of the main mass, and in which the schists are usually more than 200 feet thick. The schists are often associated with granitic veins, which occur in the rocks of the main mass, and in which the schists are usually more than 200 feet thick. The schists are often associated with granitic veins, which occur in the rocks of the main mass, and in which the schists are usually more than 200 feet thick. The schists are often associated with granitic veins, which occur in the rocks of the main mass, and in which the schists are usually more than 200 feet thick. The schists are often associated with granitic veins, which occur in the rocks of the main mass, and in which the schists are usually more than 200 feet thick. The schists are often associated with granitic veins, which occur in the rocks of the main mass, and in which the schists are usually more than 200 feet thick. The schists are often associated with granitic veins, which occur in the rocks of the main mass, and in which the schists are usually more than 200 feet thick. The schists are often associated with granitic veins, which occur in the rocks of the main mass, and in which the schists are usually more than 200 feet thick.

A north and south trend of red rock, very similar to that of the Galaxy Island red porphyry rock, breaks up through the gneiss and silt a little N.E. of Rinnmore Point, and it from a large cone extends towards the S.W. from a little S.E. of that point, having been described during low water by Thomson's Pier along the strand south of the Chandlery.

In the Galaxy river the rocks seem to be different varieties of gneiss and schists, and this strike about N. 60° E. and dip southward at about 50°. Among these rocks, the micaceous and hornblende gneisses and schists, are observed to be more gneiss than schist. The micaceous gneisses are often of a black or grey colour, containing black or grey and white mica, white felspar, and quartz, but in places it contains a pink felspar which gives its colour to the rock. A greenish felspar, that seems to be feldspathic, was noticed in some, but it appears to be confined to the hornblende varieties. In some places these micaceous gneisses occupy a considerable space, but more generally they are mixed up with the hornblende varieties, running in small veins in tumbled layers and lensoidal patches; generally the hornblende gneiss has epidote as an essential. While opening sewers in the town of Galaxy, in Abbeygate-street, they cut through gneiss that was very epidotized. Iron pyrites occur more or less in minute veins, specs, and layers; but, scarcely, more especially in the hornblende varieties, some, in which the magnetite pyrites abound, might be called epidoteschist. A bed of epidoteschist was observed in the field opposite the gate into the grounds of the Queen's College, some of the ore being changed into mosaic ore.

A little west of the Galaxy river, at the bridge into Nun's Island, a rock similar to the Galaxy Island red porphyry rock occurs; it was also observed near the Lying-in Hospital and West House; moreover, we were informed by Mr. Roberts, the County Surveyor, that on the Railway, near and to the south of the railway, are metamorphic sediments with a few intrusive rocks. The former consist of micaceous and hornblende gneisses and schists that have a nearly strike of N. 25° E., with a nearly dip varying from 70° to 80°. In some of these the foliation is curved and nodular, and when the endosmoses are of the red gneiss, while the rock is black or hornblende, the rock has a marked appearance. On the strand, around 500 yards east of Rinnmore Point, there is a N. and S. dyke of blue compact, although, rifle, felspathic granite, that may be a diabase or melange, the structure being highly fissile. Here it may be mentioned that Mr. Mell, in a paper read before the Royal Irish Academy, no. 20, records that in the excavation for the new dock of Galaxy, which lies nearly half a mile west of this place, a white felspar was found at the lowest part of the works. He calls it "horoblastic," and says it intrudes into the associated gneisses and schists; pieces of this rock were observed in the walls about the works, and are said to have been found a little east of the main mass. However, as it is not identified with the rock specimen, N. 547, in Kranius's collection at the Geological Survey Museum, Stephen's Green, Dublin, and called by him epidote or epidotize rock.

1 Similar rock specimens in the Geological Survey Museum, Trin. Coll. Dub., are called by Professor Haughton, 547a, &c. 547b, by the same, as also specimen, N. 590, in Kranius's collection at the Geological Survey Museum.
bed, as apparently it is by conformable with the associated beds of granite and schist. In the field opposite to the College gate the granite and schist strike east and west, and presumably with the same strike is a white rhyolite or felsite, very like those previously mentioned as occurring near Lismore Point, and in the new dock.*

West and south-west of West House there is granite with a few schist; however here the strike has changed to N.E. and S.W. and west of this is a masked cuesta of the supposed metamorphic felspathic intrusive rock; not only for its own peculiarities, but also as west of it only three exposures of the metamorphic sedimentary rocks were observed; one being about 100 yards north of Shantallow, another in the vicinity of Straw Lodge, and the third a detached locality north of Blackrock, of which more hereafter.

This cuesta of supposed metamorphic, felspathic, igneous rock extends nearly N. and S., and towards the south can be first observed at the end west of the Recorder's Ferry, from whence it can be traced northwards by Marrow Cottage into the Shantallow demesne, where it seems to divide into three branches, the western extending north to Straw Lodge, the middle branch seems to run only a short distance north of the Shantallow road, while the eastern branch apparently does not cross it. This rock is of a very porphyritic nature, and generally of a greyish green colour; the most conspicuous minerals it contains, is an aggregate, being crystals of green pink and white felsite, globules of quartz, and minute spangles of mica. The globules of quartz in places are so numerous as to give it a pisolitic appearance, and often with a lens their crystallization can be seen, in fact in some it is visible with the naked eye. Up against and seemingly lying on the middle branch immediately N. of Shantallow are granite, and also in a quarry at the east side of the townland of Shantallow; with the west branch the granite is in junction a little south of Straw Lodge. West of Brickyard Lodge, which lies nearly a quarter of a mile west of Nunsand House there is a white felsite or felsite, that seems to be in a north and south direction. Whether this is a metamorphic, or more modern igneous rock, is not apparent, the exposure being so small. Further north, from the Queen's College to Ashley Park, there are various small exposures of nearly perpendicular granite, with a few schist, that are generally of a hornblende nature; they strike nearly east and west (N. 10° E. to N. 9° E. 2°). Associated with these, a little S.W. of Rock Lodge, is a north and south cuesta of a porphyritic rock, that is supposed to be a metamorphic felspathic igneous rock.

The rocks in the part of the West Galway district where metamorphic sedimentary rocks occur, associated with what are supposed to be metamorphic igneous rocks, have now been described. In the rest of this district, although the mass of the rocks are supposed to be metamorphic, yet in no place, excepting a very small patch north of Blackrock, are metamorphic sedimentary rocks observed; however, they possibly may exist between the courses of the other rocks, as they are of a much more fossiliferous nature, therefore more easily denuded. If this suggestion should chance to be correct, the metamorphic sedimentary rocks are now covered up and observed by the Devonian beds, in many places it is impossible that they could exist, and in most localities it is quite evident they were superseded by the igneous rocks that are supposed to have invaded them subsequent to their first formation, and prior to their being metamorphosed. Previous to entering into the description of the other rocks it may be mentioned, that among the metamorphic sedimentary rocks just described, no vein or fracture of granite was observed; the nearest exposure of this kind of rock to them being a small granite situated about 100 yards north of Shantallow, very near which, on the S.E. is an exposure of granite; a granite in the S.E. part of Shantallow demesne, which is a little N.W. of an exposure of granite; and a north and south granite vein south of Ashley Park, close to where hornblende granite seems to merge.

In the rest of this district the supposed metamorphic felspathic igneous rocks range from a rock very like a granite, to a rock that is nearly a pure felsite. Immediately west of the metamorphic sedimentary rocks they seem to occupy most of the country, but further west they are much intermixed with the granites, and west of the road from Barna to Kinvarra most of them disappear, seemingly having been gradually absorbed into the mass of the granite. Also, they all seem to have a tendency to occur in courts. A little W. and N.W. of Galway the courts bear nearly N. and S.; at the Killarney and Blackrock, and from that to some distance north of Ballynahone, they strike about N.N.E. and S.S.W., while further north, south, and north-west of Ballynahone the bearing changes to about N.N.W. and S.S.E. North-west of Blackrock they run nearly N. and S., while further north, on the east of Ballynahone, they strike about N.N.W. and S.S.E., and west of that hamlet N.N.W. and S.E. to nearly N. and S. The courts in the east of Ballynahone seem to keep to their bearing of N.N.E. and S.S.W., as far north as Tavistock, after which they change to nearly N. and S. The courts on the east of Ballynahone run with the above bearings for only a short distance, for N.W. of Knock Narevra they run nearly N.E. and S.W., and further north they extend in wavy lines, thus having general bearings between N.N.E. and S.S.W., and N. and S.

Among the above rocks are granites that generally occur in courses, having a similar bearing to the courses of the associated rocks; however, this is not always the case, as they are often found in masses and irregular masses, that dovetail into the supposed metamorphic felspathic igneous rocks. The masses and masses, especially those furthest towards the west, generally are the porphyritic granite, with large pink felsite crystals, while the courses and veins usually are of felsite variety, in which no one mineral is developed in conspicuous crystals, all the minerals being somewhat of nearly equal sized crystals. Of those there seem to be very marked varieties, one being a fine mottled red and yellow rock, and the other pink; besides those there are veins and fractures of the typical intrusive granite. In the latter the felsite base seems sometimes to predominate more, the result of the quartz and mica, changing it into felsite rock; it is often of a greenish pinkish white color, and of that are numerous minute greenish chlorite looking veins, from which the stone splits up into irregular pieces, thereby spotting it for anything but the coarsest building purpose. The relations between the granite and the supposed metamorphic intrusive rocks are obscure, as no sections are exposed, the only case observed being as follows:—In the shallow quarry, about 100 yards north of Blackrock, were metamorphic sedimentary rocks observed; however, they possibly may exist between the courses of the other rocks, as they are of a much more fossiliferous nature, therefore more easily denuded. If this suggestion should chance to be correct, the metamorphic sedimentary rocks are now covered up and observed by the Devonian beds, in many places it is impossible that they could exist, and in most localities it is quite evident they were superseded by the igneous rocks that are supposed to have invaded them subsequent to their first formation, and prior to their being metamorphosed. Previous to entering into the description of the other rocks it may be mentioned, that among the metamorphic sedimentary rocks just described, no vein or fracture of granite was observed; the nearest exposure of this kind of rock to them being a small granite situated about 100 yards north of Shantallow, very near which, on the S.E. is an exposure of granite; a granite in the S.E. part of Shantallow demesne, which is a little N.W. of an exposure of granite; and a north and south granite vein south of Ashley Park, close to where hornblende granite seems to merge.

* These are somewhat like Kratzer's "Leguminosae" or "white stone."
similar to the felspar crystals in the so-called Ballynarrick granite, having a pink centre enclosed in a pale greenish envelope, the centre of the crystals being orthoclase, while the outside portion is oligoclase. Near the same are other crystals which are very minute, but farther north they are well developed. At the bridge's building there is a fine felspar, in which minute globules of quartz; here it may be mentioned that in nearly all the felspars of this district there are globules of quartz, but in some they are so minute as to be scarcely visible, while in others they are widely disseminated through the mass. The only exception being a white or yellowish white felspar, that hereafter will be mentioned as being supposed to be part of the intrusive granite. At the boundary of the townland of Loughcrew there are red and green felspars, and abutting against them green felspars. South of the site of Loughpatrick, opposite Mr. Black Foster's house, is a peculiar ferruginous rusty granite, which seems to be part of the intrusive granite, and in it are stringers showing traces of copper and lead. To the west side of this granite are green felspars. At the east of the Ballisheery rock, called Trawbragh, is a red felspar, while to the west is the fine red granite. Opposite the east gate to Rockbendoon is red felspar with green veins, and alongside it is green felspar; a little further west is a course of red granite, and further west are red and green felspars. Nearly opposite the west Rockbendoon gate a red felspar felspar is a curve over a green; farther west a peculiar felspar granite occurs, and is succeeded by a white felspar. Opposite the Manor Lodge there are porphyry felsparic rocks. At Blackrock was observed a vein of fine granite breaking up through a porphyry felsparic rock. West of this, between the road and the sea, the rock seems to be a mass of the intrusive granite. In a few places very small detached patches of the Carboniferous associated conglomerate were observed in hollows among the above-mentioned rocks; one may be seen on the strand, nearby opposite the Eglington Hotel, and another 200 yards further west.

On the north of the Blackrock road, between it and the Taylor's Hill road, the rocks seem to be usually felspars or porphyry felsparic rocks, as only two short courses of granite were remarked. These lie nearly immediately N.B. The townland of Ballynarrick is a very small patch of granite and suit similar to those in the immediate neighbourhood of Galway. In the tract contained between the Saulhill road, the Taylor's Hill road, and the road from Ballynarrick, there are various felspars and porphyry felsparic rocks; masses of intrusive granite are found in the hollows about a quarter of a mile south of Taylor's Hill House, and N. and S. of Mr. Daly's new house. Forming the hill north of Viner Cross there is a base of evenly grained red granite, and further eastward, L.R. and W. of Shantall House, are coarse and veins of a similar rock. In this neighbourhood there are numerous varieties of the porphyry felsparic metamorphic intrusive rocks, the most remarkable being one in which there are large and small crystals of bright red orthoclase enclosed in an evenly grained pink and green felspar, and mass of crystals being two inches long, these crystals, as previously remarked, being similar to those constituting the Finland rock called repuydrag granite. Another banded rock is found a little west of the last, containing, besides various felspars, crystals of a green epidote granite.*

* A greenish rock containing bands of minute epidote crystals is very like the rock No. 803, in Kramer's collection, and called by him epidotite.

20

while the latter are peridotic rocks with crystals of red felspar, globules of quartz, and flakes of a greenish mineral that looks like an earthy chlorite. In places they are very grarian in aspect, more especially in some adjacent porphyry granite groups. In the neighbourhood of Letteragh, which lies a little S.W. of Ballynarrick, a fine line grained granite course were remarked that may be the southern extension of those found between Lough Aune and Ashley Park. To the north of Lough Aune there is a small tract of country occupied by the typical porphyry granite. S.W. of this, a little S.W. of Tornagrook, there is another small tract of porphyry granite, and among the tephritic rocks hereabouts there are veins and courses of it. North and north-west of this, S.W., S. and S.E. of St. Oran's Cottage, there are numerous masses of granite, some of which are the porphyry granite, S.E. of St. Oran's Cottage, and immediately S.W. of River View, there are white felspars, in which there are few or no globules of quartz. In all the felsparic rocks adjoining the Lemanagh country, strings and small veins of iron pyrites were removed, with (in places) traces of galena and copper pyrites. About half way between St. Oran's Cottage and Woodslock House there is a small tract of porphyry granite, and on the west of Woodslock is the margin of the mass that forms the E. of Woodslock the felsparic rocks appear to be interlaced with the outside part of the mass of the porphyry granite, and further south the latter rock seems to extend eastward to about halfway between Drumlooghe and Drumlooghe East. South of this, and east of Corbolus, there are felspars and porphyry felsparic rocks, interlaced with masses of quartz. Moreover there is a narrow tract that extends into the mass of the porphyry granite for about a mile on the S.W. of Corbolus, in which are courses of porphyry felsparic rocks, the most western running about N.S.E. and S.E., while the others bear about R.N. by E. Half a mile S.E. of Corbolus the boundary of the mass of the porphyry granite is deflected towards the east as far as the nearly N. and S. road north of Cappagh, and from these it goes in a curved line towards the west until it meets the road a little north of the hamlet called Aille; hereabouts, a little S. of where the "y" in Corbolus is written on the present map, there is a vertical dyke in the porphyry granite. It strikes about N. 60° E., is 175 feet wide, and seems to be one of the more modern igneous rocks. It is felsparic, but at the same time may be diorite, before the blowpipe it fuses slightly. However, in is globules of quartz were remarked. This dyke can be traced for about a quarter of a mile to the south. On the border of the bog it is a porphyry, that seems to divide into two branches, the southerly of which is few feet wide, and strikes N. 40° E. A quarter of a mile N.E. of Aille there are two small compact felspar dykes, slightly porphyry, in the porphyry granite. The boundary of the mass of the porphyry granite in the neighbourhood of Aille and Cappagh, and from that to Barn House, is very irregular, as courses from it extend into the felsparic rocks, and courses of them into it. N. of Cappagh the porphyry granite and the felsparic rocks may alternate in courses. In this neighbour-hood are some thin dykes of apparently more modern igneous rocks, very felsparic in their nature, and one being bifurcated. They lie about a quarter of a mile N.E. by N. and N. of Cappagh. South of the porphyry granite which is situated S. and E. of Cappagh there are courses of porphyry granite, alternating with others of the intrusive granite, or with felspars, or porphyry felsparic rocks. In some of the latter there are crystals similar to those in the Ballynarrick granite.

To the N. of the road that runs from Barns House there are masses of the intrusive granite in the felsparic rocks, also some courses of the porphyry
granite. North-east of Barna House, and west of Kinloghtown, there is a peculiar serrated white felsite rock in which no globules of quartz were detected. This seems to be part of the intrusive granite, which has lost its outer constituent, and changed into a "felsitic rock." On the N. of the White Strand, at the groyne on the east of Barna House, is the porphyritic granite, while there are felsites south of Barna House, at Barna House, and about 500 yards east of it. To the west of the White Strand the rock is similar to that on the north, being the typical Galway Porphyritic granite, containing large fresh-coloured or pink crystals of felspar, with crystals of hornblende and gneiss. Nearly due S. of Barna House, and about half a mile S.W. of Bannack Point (in Sheet 114) there is a rock called Gray Rock, which is composed of dykes of greenish felsite and courses of porphyritic granite that run nearly E. and W. The felsites seem to be one of the more modern igneous rocks.

In the vicinity of nearly all the tracts of the porphyritic granite that comes up through the foliatable rocks, and also near the margin of the mass, are patches of the foliatable rocks lying on the porphyritic granite, or curiously contorted with it, or perhaps the latter may be contorted in the courses of the former; this can be well seen in the neighbourhood of Tadrocky, south of Woodstock, and, to the east, and south of Corrib, in the neighbourhood of Allihies, and in other places; and from the relations of the rocks to each other it would appear as if the granite were in a plastic state at a later period than the foliatable rocks.

Y. The Kilbawn and Monevally District, or the wild rocky Country north of Galway Bay.—The typical rock of this district is porphyritic granite, having as its conspicuous essential large pink or flesh-coloured crystals of felspar (orthoclase), with smaller of sea-green (oligoclase), and white felspar, grey quartz, and black mica. In places they are found as boulders of hornblende, sphen, white mica, a quartz mineral that may be an earthy chlorite, a mineral that seems to be epidote, and iron pyrites. However, in places this granite is not porphyritic where the pink crystals of felspar are of a similar size to the other constituents, and in some places there is a granite in which the pink felspar is or the green felspar is absent, while in other the conspicuous crystals are white felspar. In some places the rock seems to be massive, in others there appears to be an obscure foliation, while to the north and north-east there is a well-developed foliation that becomes more and more conspicuous, as the margin of the granite is approached. In some localities there are masses of a black or greenish granite, with mica, veins, and courses of the intrusive granite of the supposed metamorphized foliatable rocks; the latter being more numerous among the rocks in the West Galway district, in the vicinity of Galway Bay, and near the north and north-east margin of the granite, most especially in the two first mentioned localities. The intrusive granite would also seem to be more abundant in the vicinity near the margin of the mass of the porphyritic granite. North of Barna there are many courses of the foliatable porphyritic rocks and felsites; near that village they have a tendency to run nearly north and south, while farther north they bear about N.E. and S.W. N.W. of the Barna Coastguard Station, in the granite, there are four dykes of greenstone rocks; the three eastern bear about N. 30° E., two of them being gray and hornblende, containing hornblende, quartz, felspar, and flakes of a mineral like an earthy chlorite; while the third, which lies west of the others, is of a yellow colour, and seems to consist of quartz, felspar, and mica. The fourth line further west, bearing N. 45° E., being a grey colour and hornblende nature.

S.W. of Barna, at and near the shore, a nearly north and south course of yellowish gray felsite was observed. The granite hereabouts seems to contain hornblende, sphen, copper, and iron pyrites as accessories; it also in places is foliated. Further north, and a little east of Trukey, is a small vein of iron pyrites, and northwest of that hamlet is a N.W. and S.E. course of riband felsite. To the N.W. of Trukey, in the neighbourhood of Clongrobin, there are courses, sphen, and small tracts of both felsite and porphyritic foliatable rocks; and similar rocks are found east, north-east, and north of Lough Inagh, while N.W. of that lake there are courses of porphyritic granite alternating with courses of these kinds of rocks. The courses N.W. of the lough bear about N. 20° E., while those on the north and east vary from N. 45° E. to N. 70° E.

Along the sea-shore, between Barna and Furbo, the granites in general are not porphyritic; however, courses of that variety occur, and a little to the northward nearly all seems to be of that character, also to contain hornblende and sphen as accessories. Compact veins and stringers are very numerous in these granites, and as they are of a harder nature than the latter, they weather much less freely, and now stand up from an inch to two inches high above the moss of the rock, thereby rendering the amount of weathering since the glacial period. On the shore, near the barrier boundary, more than half a mile eastward of Martoo Cottage, and opposite Archedeon Bunson’s new house, there is a large angular block of carboniferous sandstone, that may be only a short distance removed from its parent rock. A little west of Murisco Cottage two nearly N. and S. dykes of slightly porphyritic felsite were observed; and a course of similar rock, was traced for about three-quarters of a mile towards the northward, to a little S.H. of the hamlet called Pichon. West of Bilbney’s very large flakes of white mica were remarked. Near Furbo Bridge is a felsite. Hereabouts, in porphyritic granite, are large crystals of felspar, that have a pink centre enfolded in a white envelope. Further westward, on the sea-shore, south of Lippa and Derrynamoon, are rocks with a well-developed foliation, that bears N. 30° E. to N. 50° W. They seem to be a patch of gneiss and schist blending into the granite, or possibly they may be the greisen rock previously described; as a dyke of very similar rock, with a foliation that bears N. 30° W., was observed in the same west of the Furbo Wood. Hereabouts the fine granite are divided by joint-like lines into courses that have a bed-like appearance; moreover, the granites between those lines have different colours and textures, and appear to be of slightly different composition; besides, the lines seem to be in parallel places with those of the foliation of the associated gneiss and schist.

North of Furbo, places in the granite are very coarsely crystalline, the crystals of felspar being over an inch long; and near Selmín, Mrs. Blake of Furbo procured very curious quartz crystals that has a foliation. West of Selmín is a N. and S. course of red, finely crystalline felsite; and north-west of this locality, along the Knock River, was observed a green porphyritic foliatable rock, a compact felsite, and near the small lake a riband felsite and a porphyritic green foliatable rock, with four red crystals, that seems to be gneiss. East of these, in the vicinity of Shamoosrán, and Deerpark, two N. 30° E. courses of porphyritic green foliatable rocks were observed. Further north-west, at Derryn, are two nearly N. and S. courses of foliatable, porphyritic rocks, and north of that place, due west of Lough Inagh, are courses of very similar rocks running irregularly, but having a general N.E. and S.W. bearing, while close to the village is a dyke of riband felsite, that bears nearly north and south. There is also a

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* A strip along the extreme south in is Sheet 114.

† The largest crystal measured was three inches long and one inch square.
mineral vein, that runs N. 30° W., containing chlorite and felspar, in which pieces of galena are said to have been found. West and north of Longh is a course of red foliated rock, slightly granitite in appearance. Southwest of Langhill, in the country about Longh Kirk, bones and small expanse of the porphyritic granite were observed; and further east, north of Doocamhill Lough there is an outcrop formation in the granite, for which it is viewed in that the large crystals of felspar are in rude lines. Hereabout a N.E. and S.W. course of porphyritic foliated rock was observed also a course of red rock, like that in the vicinity of Langhill. Near Poolnaugling there is a mass of felsite in porphyritic granite. Further northward, in the neighbourhood of Kirkham, hornblende and sphenite were observed in the porphyritic granite; however, they do not seem to be essential, but only accessory, while still further northward, and west of Ballintoy Lough, in the river, a course of granite was remarked in which iron pyrites seems to be an essential, and chert by a psammitic rock. Near the bridge the latter is of a greenish colour, with a few pale green felspar crystals and a little free quartz, while the east part is finely porphyritic, containing black mica and veins of free quartz—two granites between this and the boundary of the Carboniferous rocks seem to be partly the intrusive granite, very coarsely crystalline, and partly the porphyritic granite. N.W. of the last locality in the vicinity of Vaggrgill, is a tract of psammitic porphyritic rock, and northward of it near Moycullen is a peculiar greenish granite, in which a green epidote mineral seems to be an essential; near there, in the vicinity of the road from Moycullen to Spiddal, are green and red tuffaceous rocks, while in the country west of this road about Langhill Averanmore and Droconamore nothing but porphyritic granite was observed; but further southward, in the neighbourhood of Kenagh, there are well marked courses of these supposed metamorphic, igneous, felsite rocks. Two courses near the longh are of a greenish colour; not another, that runs nearly parallel with the road, and through the place where the hantlet formerly existed, is very similar to the red rock near Langhill, having somewhat a granitic appearance, but having disseminated through the mass globules and crystals of quartz, and minor degratory cavities, with a green mineral-like epidote. West of this course, near Langhill Bridge, is another course of greenish granite. Further west, about Shevramore and the neighbouring heights from this to the Owenbolka, and beyond this river to the margin of the district, no rocks, except the porphyritic granite, with its accompanying coarse veins and striped granites, were observed; however, southward the supposed metamorphic igneous rocks do occur, one being remarked at Knockrath Lough, which lies more than two miles south-west of Langhill; this is a greenish, yellowish, porphyritic rock. West of this, near Bolsha Lough, are N. 30° E. courses of red rocks, somewhat similar to those mentioned in the vicinity of Kenagh and Lammie. In the porphyritic granite homb plunge there is an essential, and also occurring in small patches, peaks, and near the course that is greenish mineral, that are often an earthy chlorite. At the S.W. end of Bolsha Lough there is a N. 30° E. dyke of a purple felsite, that in places contains semi-crystalline mineral which appears to be white, with a white quartz, and the rock mass weatheres like a breccia. Further west, half a mile N.W. of Longh Neall, there is a N. and E. course of white felsite, and half a mile west of the same lake is a nearly N. and E. course of grey felsite. About two miles S.E. of Longh Bolsha, extending N.E. from the hantlet called Ballyduffamna, for a considerable distance, is a course of felsite that is either yellow or white, and in places foliated or of a ribbed structure; west of this, the road three nearly parallel courses were remarked, the two northern being red felsite, and the other a gneiss or quartzitic felsite. From near the south end of the long course there is another running nearly N.E. (N. 40° E.) towards the hill called Knock anseran; this towards the south is a yellow or white felsite, while near the

kill it has minute crystals of a green mineral, and there is a thin N.E. and W. dyke of felsite, one of the more modern igneous rocks, that has a platy structure cutting across it. South of this, between the hantlet called Furt and the sea-coast, is a small tract of felsitic rock. Near the coast from this by Spiddal to the west a dyke of mottled felsite. Near the coast from this by Spiddal to the west a dyke of mottled felsite. Near the coast from this by Spiddal to the west a dyke of mottled felsite. Near the coast from this by Spiddal to the west a dyke of mottled felsite. Near the coast from this by Spiddal to the west a dyke of mottled felsite.
while on the east it bears nearly north and south and N. 45° W., with easterly and northerly components. In some of the granite there are veins of parallel oblique joint lines that bear east and west, with a north dip of 45°. East of this at Longh Namoreen, the boundary of the granite suddenly jumps towards the north-east. This possibly might be caused by a fault, as the strike of the foliation in the granite, as before mentioned, is apparently in parallel planes to those of the stratification of the overlying metamorphic rocks, both having a bearing of about N. 50° W. which causes, as there is no bend in the strike of either, the continuation of the metamorphic rocks to be cut off by the porphyritic granite. Against the supposition of a fault is the enormous amount of the dilatation, being at least 6,000 feet; however, on looking at the one-inch map, it will be seen on the N.W. of the supposed line of fault, about a mile north of Longh Namoreen, that the lowest beds of limestone above the granite are about the same thickness above the granite as the limestone at Ballylough, on the B.E. of the line of the supposed fault. The question of a fault will again be referred to when describing the metamorphic rocks. Besides the supposition of a fault causing an irregularity in the boundary, it is quite evident that here an outcrop of an intrusive granite helps to make it complicated, as a tract of this kind of rock, which occurs veins into the metamorphic sedimentary rocks and the porphyritic granite lies half a mile west of the summit called Shasavare. South of Shasavare may also be a dike or fault jumping the boundary, a downdraw to the west. If it exists it would seem to be a compound or step fault consisting of two or three steps, two being apparent, and the third being suggested by the line of the rocks. This would also be a large displacement, being about 1,000 feet; but that this fault does exist seems proved not only by the irregularity of the boundary of the granite, but also by the beds of limestone in the neighbourhood of Ballylough, which also are displaced in coincidence with at least two steps in this fault.

The boundary to the south-east of this is very regular, curving with the stratification of the overlying gneiss and schist; if we except the part of the south-west of Ballylough, north of the summit called Knocknanny, where there is a large outcrop of the intrusive granite.

What may be a proof that part of the porphyritic granite was formed in situ, that is, that of the metamorphic rocks, from which it was originally, were only mineralized, may be suggested by beds of what seems to be gneiss in the porphyritic granite. Some of these occur near Ballylough Lodge. 

Fig. No. 1, a diagrammatic sketch, shows these rocks, which are perfectly foliated; as on these rocks, which are apparently there are five separate divisions: the first, or south-west, having oblique folia
tion; the second, or north, parallel to the folia
tion in the associated porphyritic foliated granite; the third, oblique; the fourth, slightly oblique; and the fifth, perpendicular. Further south-east, immediately north of the summit of Knocknanny is a white ragged quartzite. Its relations to the granite are obscure, as the granite surrounding it is a green granite, having a mineral like epidote as an essential, which seems to be a peculiar variety of the intrusive granite; north of it, in the valley, is the large tract of the intrusive granite previously mentioned, while in the W. N.E. and E. of the hamlet called Cloghvalley, is the porphyritic granite. Between two and three miles

It is almost remarkable that the boundaries of the porphyritic granite should affect the beds in a greater degree only up to a certain set of beds and apparently not irregularly, but that it does so would seem proved by the beds of limestone being at about the same distance above the boundary. Further west, on the slopes of the other granite, the action does not seem to be so rapid.
three dykes of granite were observed, the two southern bearing nearly S. and W., while the other runs N. 60° W. The inclination of the latter runs N. 60° W., while the N.E. is N. 65° E., which seems to prove that the granite vein runs along a line of discordance, or fault. About a mile north-west of Dromore, at and in the vicinity of the summit of Knockre-
sean are various intrusive rocks; a little south of the summit is a N.E. and S.W. dyke of a quartzite-like rock, supposed to be a metamorphic, foliated, rock, which has NOT been seen the beds obliquely. Forming the summit, but ruptured by granite veins, is hornblende rock, of which the following description was noted:—"Schists hornblende rock forms the peak of this hill. It breaks up through and across the beds of the associated gneiss and schist; nevertheless, its formation, although weak and coarse, has given a general parallelism to that of the metamorphic sedimentary rocks. Baches and pipes of similar rock, occur in the vicinity of the peak, especially to the south and south-west. A little north of the peak is a second vein of a granitic rock that bears N. 60° W. The metamorphic sedimentary rocks are principal- ly hornblende gneiss and schist; however, many of them are micaceous, moreover, there were beds of felsite and epidote schist observed. Half a mile north-west of Knocksean is a small outcrop of granite, observed, and north of the peak is a N. 30° E. course of quartzite porphyry. The latter is probably connected with a small outcrop of similar rock, observed about half a mile S.W. of Buffly Lough, being a somewhat similar rock to the quartzite porphyry, under the west part of the town of Galway; here one of the essentials of this rock seems to be a green mica-like epidote. From a mile to a mile and a half E.S.E. of Buffly Lough, there are small veins and outcrops of granite in vertical gneiss and limestones. The granite ruptures the beds, also a near N. and S. fault a little north of the west, however, beds on both sides of the fault strike nearly east and west, while further west they range N. 65° W. The limestones are very white and pure. Lying immediately south of the granite, on the west of the fault, is a very small outcrop of hornblende rock, and east of the fault, south of Buffly Lough, is a small mass of white quartzite, but its relations to the other rocks are unknown, as it lies isolated. The limestone can be traced north-westward to the summit of the hill, while the granite, however, seems to be ablated twice by faults, one being S.W. of Knockinfin Lough and the other a little S.E. of the south end of Buffly Lough. Immediately west of Buffly Lough, the beds range N. 30° W., but S. and N. 30° E. course of quartzite porphyry, with a small outcrop of granitic rock to the N.W., half a mile S.E. of Lettermacaff, Buffly Lough, is a vein of greenish rock cutting across the beds, but being fossilized. Here the limestones have a slight eastward inclining, the dipping being a little more towards the east (N. 60° E.) than that last recorded. Half a mile northward of the fossilized dyke is a small oblong outcrop of hornblende rock, and further west, is a vein of hornblende rock, and in the neighborhood of Knock-
sean, the limestones are veins of hornblende rock and gneiss, and, as far as the geological point, is a vein of epidote rock, while south of it are pyrrhotite and epidote schists. A mile S.W. of Knocksean there are beds of limestone that strike about N. 60° W., parallel to the boundary of the fossils porphyritic granite; they also about a mile from that boundary. These facts seemingly are important, as this locality is north-west of the margin of the boundary of the fossilized porphyritic granite, as also all the detailed pieces of this limestone bed previously mentioned, which would seem to suggest that the jump in the boundary of the fossilized porphyritic granite are caused by faults. A small south of the limestone is a mass of rock that seems to be one of the more modern intrusive igneous rocks. West of Buffly Lough, in the river, is a vein of granite with flying veins of granite, containing calcite, flour spar, and traces of copper with pyrites. Further west, running parallel to the summit of the porphyritic fossilized granite is a dyke of compact feldspar in hornblende schist; this dyke-rock seems to be one of the more modern intrusive rocks, as it runs across one of the veins that displaces the boundary of the granite. The dyke-rock seems to be one of the more modern intrusive rocks, as it runs across one of the veins that displaces the boundary of the granite. N.W. of this, immediately east of the summit of Knockreasean, is a tract of seemingly metamorphic hornblende igneous rock, being partly hornblende rock and partly the greenish schist, before described, as sometimes being an affiliate of the hornblende rock. Here, these two kinds of rocks seem to merge into another, but possibly the granite may be the intrusive granite, which has taken up constituents from the hornblende rock and become incorporated with it. Hornblende the sediments metamorphic rocks dip E.N.E. from 40° to 50°; there are several small outcrops of porphyritic granite here. Further west, a little S.W. of the previously mentioned considerable tract of the intrusive granite is a patch of hornblende rock, lying a little S.E. of Loughmonee, through which is a granite vein, and south-west of it at the edge of the lake is an outcrop of the granite that seems to be entangled with an epidote felsite. Here there is a rupture in the beds of the granite and schist as the strike suddenly turns to the S.W., however west of the streams the beds follow their original course. South and south-west of the lake is a long irregular N.W. and S.E. tract of hornblende rock, cut up with veins and patches of granite, and further S.W., forming the peak of Derrada, is a tract of hornblende rock. The sediments metamorphic rocks dip S.E. at 70° to 80°, and seem principally to be hornblende; however, intersected with them are micaceous schists and gneiss. In some of them were remarked small nodules of an ochreous variety of hornblende rock. A little north of the summit of Derrada is a small patch of hornblende rock, along which is granite, and in the neighborhood are veins of the latter kind of rock, while the S.W., a little north of the north end of Lough Naunore is a small tract. A little further west is an outcrop of hornblende rock, and to the south west of Lough Naunore is an E. and W. course of gneiss and schist, with a few beds of greenish quartzite and felsite schist. A mile S.E. of Lough Lough, a rather large outcrop of hornblende rock, with a few beds of greenish quartzite and felsite schist, is a small outcrop of hornblende rock, and further west, at and in the neighborhood of Knock-
sean, there are veins of hornblende rock and gneiss, and, as far as the geological point, is a vein of epidote rock, while south of it are pyrrhotite and epidote schists. A mile S.W. of Knockreasean these are beds of limestone that strike about N. 60° W., parallel to the boundary of the fossilized porphyritic granite; they also about a mile from that boundary. These facts seemingly are important, as this locality is north-west of the margin of the boundary of the fossilized porphyritic granite, as also all the detailed pieces of this limestone bed previously mentioned, which would seem to suggest that the jump in the boundary of the fossilized porphyritic granite are caused by faults. A small south of
At the north-west corner of the district there is part of a tract of the intrusive granite, which extends into the district on the north and west. Half a mile east of this, in a ravine, is a remarkable dyke-like mass of conglomerate, which seems to be part of the basal conglomerate of the carboniferous rocks that were deposited, filling up a fissure in the more ancient rocks. South-east from this there seems to run an axis of a synclinal curve, as thereabouts are limestones on the north dip S.E.E., at 60° to 80°, while those to the north dip S.W. at 70°. Under the limestone is a massive granite, or perhaps some kind of eruptive foliaque rock; it breaks up into angular fragments. A little west of this there seems to be a nearly north and south fault, that strikes these beds to the north-east, beyond the limits of this district; however, further east other limestones appear at the margin of the bog, seemingly brought into their present positions by a fault, a downward throw to the E. They are nearly vertical, but appear to have a slight dip to the north, while the rocks on the west of the fault dip N.E.E. at 80°.

A little N.W.W. of these limestones is a small tract of granite. Further eastward, and S.E.E. of Lough Atemann, are beds of limestone that dip to S.W., at 30° to 40°. In these there are patches of irregular beds, and sediments of granite and slate; moreover, they are much broken by veins of granite, and to the S.E. they are replaced by a tract of that kind of rock; no limestones occurring for nearly a mile to the south-east, where they were observed in the neighbourhood of Lough Tawry, south of the hill called Craggaun-acenth. In the neighbourhood of this hill the country seems very much disturbed, as for just observed, there are limestones to the N.W. and S.E. of the S.W. spur of it. These have similar strikes, and lie in the same zones (county N.W. and S.E.), and dip S.W., at 70° to 80°, but between them the rocks strike east and west; moreover, on the north of Craggaun-acenth, at the south end of the lode there are limestones that strike E. and W., and dip S. at 80°; evidently being part of the limestones that lie to the south and east, but pushed out here by some rupture or dislocation. Even in the vicinity of the lode the ground is very much disturbed, as proved during the mining operations, as the limestones at the lode are ruptured by an outcrop of granite, and a wide course of fine hornblende rock, and a very little further west is cut by a slide that runs N.W. and S.E. A little west of the slide is a nearly north and south dyke of granite, which seems to be cut off a little to the south by an E. and W. vein, of a similar rock; south of which, in the strike of one of the granite veins, is a N. and S. dyke, that heads west at 80°; while further south, in the same strike, and apparently in its continuation, is a dyke-like course of a rock that seems to be granite. Immediately to the south, to the west of Craggaun-acenth, is a considerable tract of white quartzite, while at the peak, and extending west into the quarzite is an irregular long tract of granite, and in the south of the summit, and extending for some distance towards the S.S.E. by S. in a course of quartzite, that is bounded on the east by a course of granite, and a little S.E.E. of the latter course, in the granite and schist, are irregular veins of the same rock. The relations between the granite and the associated granite and schist are not very clear, as the hill is more or less covered with bog. These latter rocks in the neighbourhood of the south Cregg lode, east of Craggaun-acenth, south-west and immediately north of the granite strikes E. and W., and dip at a high angle to the south, except due west of the granite, where they enter into it, and at which place there seems to be an anticlinal curve, as the rocks dipping N.W.W., at 60° at S.S.W., by S. at 70°; also farther north, near the margin of the bog, where they strike in the granite and schist suddenly changes and turns round to the north. Among the last-mentioned, nearly lying between the beds, and very near to the western tract of the granite, is a nearly north and south course of white quartzite. All the quartzite in the large tract seems to strike E. and W., and be vertical or dip north at a high angle. From this it would appear that the granite and schist do not overlie it, neither do they seem to be intersected with it, but possibly it may in some way be connected with the granite, for in other places, as presently will be mentioned, the intrusive granite seems to lose its foliation, as changing through granite into quartzite. That this quartzite is an intrusive rock would seem to be suggested by the dyke-like rock, which extends S.S.W. by S. from the peak of Craggaun-acenth. Some of the metamorphosed limestones bordering the granite seem changed into hornstones. North of Craggaun-acenth, at the margin of the district, is the south extremity of the Oughterard granite district (see Memoir, 5th. Sheet 5); and further north, outside the limits of this area, mixed with the granite are quartzite, granite, and foliated rock, all apparently being parts of one mass of eruptive rock. If this is the case the granite, in place, must have lost its foliation to become granite; more of it, also its mass and other constituents to change into quartzite, while in some places, on the other hand, part has lost its quartz and mica, and changed into foliated rock. In the quartzite and granite there is a structure somewhat like foliation; however, it is very irregular, as in some places it seems to strike nearly N. and S., while in others E. and W., and N.W. and S.E. Might it not be possible for some cause, with which we are unacquainted, the constituents instead of being incorporated together form granite, have been separated, thereby appearing in some places as quartz and granite, and in others as foliated rock, while in the places where this case did not act the constituents formed the ordinary intrusive granite.

Foliation in the Metamorphic Sedimentary Rocks.—In this part of Tyrconnagh the foliation in the gneiss and schist appears always to follow the lamination in the original rocks. In a few places there is an oblique foliation that possibly might be induced by the cleavage planes; however, it is more likely it was caused by oblique foliation, for, to the north, in the country a little S.E. of Westport, county Mayo, where the rocks are partly metamorphosed, it is evident that rocks, in which a similar foliation appears, were originally obliquely laminated highly micaceous sandstones. Rocks, in which this oblique foliation was remarked, occur in the country S.W. of Ross Lake, especially in the stream a little S.W. of Drimmog House, where the lamination in the original rocks would seem usually to have been parallel or nearly so to the planes of stratification, therefore, in general, throughout this district the foliation is parallel or nearly so to the bedding; but in some places, as previously remarked, there is oblique foliation, and in others, there is spherical, wavy, or curled and crumpled foliation, perversely to be induced by the oblique, spherical, crumpled and curled laminations. In both arenaceous and argillaceous sediments rocks oblique foliation occurs, more especially in the former; however, the oblique foliation appears in both gneiss and schist.

Spheralidal foliation usually affects silties, but in some classes of sandstones it also occurs, therefore, spheralidal foliation may be found in either gneiss or schist; but in this district the spheralidal foliation seems nearly altogether to be confined to the schists.

*The geology of the area is very much obscured by bog; the rocks appear as detached masses. Possibly the foliation, quartzite, and granite may be metamorphic rock-sandstone and granite, but the rocks are not all described. Quartzites and gneisses are known to be generally changed into granite, and in the neighbourhood of Borne House, as previously mentioned, (see page 55, the granite seems to change into granite. Spheralidal foliation, as described elsewhere, that there may be differences, may be part of one mass.
The crumpled or wavy lamination seems only to occur in shale, therefore crumpled foliation ought only to be found in shale, and as nodular lamination is common to both arenaceous and argillaceous rock, so nodular foliation occurs in both greiss and schist. The metamorphic laminites that here occur are, for the most part, schistose, and may be classed with the other schists; however, it might be mentioned that the foliation which seems most to effect them are the crumpled and nodular; and when these occur together, it is not unusual to find all traces of stratification obliterated.

In the N.W. of the district, a little north of Knockavannomane, there is nodular, curled, and oblique foliation in the rocks; of one locality the following note was made: "...nodules of greiss in micaceous schist; in the former the foliation is oblique, while in the micaceous it curls round the nodules." Fig. No. 2, is a plan of part of this bed. These nodules of greiss in schist seem to be caused by the tempe of grit found in many curled shales. A little south of Knockavannomane peculiar oblique foliation was observed, of which, Fig. No. 3, is a plan showing parts of four beds. At the left-hand side of the second nearest bed, the foliation is inclined to be nodular.

In the townland of Knockenoe, south-east of Lough Atoskern, there is most completed foliation in the schistose limestones; as there are laminated masses, irregular beds, and nodules of greiss and fossils in the rock round which the foliation curls; moreover, in places combined with the nodular foliation, there is a sort of subparallel foliation with crumpled foliation; but, as there are such peculiar and intricate structures in metamorphosed limestones it does not appear remarkable that in the metamorphic rock the foliation should show such an umbilicus. The foliation at this place is so complicated that no sketch can be given, as it would be impossible by hand to make a fair picture of them.

In the townland of Kilgallie and S.E. of Belt Lough, rocks were observed in which the foliation curls round nodules, while in the latter there is oblique foliation. On the south of the summit of Knockavannomane peculiar crumpled foliation was observed (see Fig. No. 4), which seems to have been caused by small faults in the rock before it was metamorphosed. Further south-west, near the old road S.W. of Dunmore, peculiar oblique foliation was observed, of which the Figs. 5 and 6, represent two separate sets of beds. In the neighbourhood of Galway the foliation generally is parallel to the stratification; however, in the flat north-west of Lough Atoskern, some good examples of curled and nodular foliation may be observed.

Drift and other Superficial Deposits

In the drift there seems to be three well-marked classes, viz., Boulder clay drift, Boulder drift, and Esker drift. In the latter there are also varieties of these drifts, as will presently be mentioned. The first is a clayey deposit containing rounded, polished, and scratched blocks; the second is a sandy clayey accumulation, in which some of the blocks are rounded, but more usually the contained blocks and fragments are semi-angular, and in some cases angular; and, the latter drift seems to be the boulder clay drift, or boulder drift, well washed and sifted, perhaps by marine and tidal currents. Seemingly the passage from the latter to the former, is a half-washed drift, which on account of the numerous blocks it contains, might be called Rocky drift.

On the low country in the neighbourhood of Lough Corra, the nodal drift is boulder clay drift, that is, places washed into the softer drift, with the accompanying half-washed rocky drift. In the boulder clay drift, the rounded polished and scratched blocks and fragments generally lie in a clayey matrix; however, in a few places will be found small lamellar masses and layers of gravelly sands. Besides, in it a good part of the blocks and fragments are usually of foreign extraction, while in the boulder drift they are generally local.
for at the present day, about two miles west of Galway, between Blackrock and Blake’s Hill, is a breastwork built on the remains of a great causeway which formed the ancient road across the bay. This causeway is divided by a stream from the sea by a barrier of shingle, and in other places, where the low ground occurs below high watermark, similar barriers might once have existed; however, against this theory, we find in a half-mile west of Blake’s Hill, an oak stem, 15 feet long and 3 feet in diameter, immediately above the “corrib” or brine. This tree could scarcely have grown on ground below the sea level; moreover, on the Aran islands at the mouth of the bay, there are proofs of the islands having sunk since they were first inhabited (see Memoir Sheet, 115).  

The Low Country.  

Adjoining Lough Corrib are extensive flats, consisting partly of mud and partly of peat; some of the mud contains recent shells, of which the following is a list named by Dr. Melville, of Queen’s College, Galway:—  

Limonia stagnalis  
Valvata pinnatifida  

Planorbarius corneus  

Bittium tentaculatum  

Styliola partita.

In some places the mud is illuminated, a section of the alluvial flat alongside the Corribgalway river gave—  

Peat, 3 feet.  
Mud, over 2.  

The mud is usually of a muddy aspect, and in it are often thin layers of peat. It is of the same nature as that usually found adjoining the lakes and rivers whose waters are highly charged with carbonates of lime, and, as previously mentioned when describing similar deposits in Limerick and elsewhere, it appears to be deposited as the waters evaporate; while the peaty layers are plastic, &c., carried or blown into the lakes or rivers.  

At the south of Lough Corrib, bounded on the south-west by the river Corrib, and on the east by the bog called Loughronagh, is a low peaty island now divided into two by a canal called the Friar’s Cut, which runs across the bog to make the lake navigable, and has been deepened and widened.  

Under the bogs south and N.E. of Ballinduff Bay, and the bog N.E. of Annagheena, there are clays from which are made a coarse brick.  

The most prominent trees in the bogs are elm and willow; however, in some, oak and yew, &c., are also found. Many of the dais “sticks” are of considerable size. Not uncommon is the association of the bog timber, it ought to be mentioned that on the limestone crags north of Ross Lake, there are the remains of very ancient pines, which seem to cover the yew found in the bogs. Of these twelve were counted; however, many of these are more stumps, parts of the trunks of four or five only remaining. Sir W. Wilde has figured the most perfect of these in *Lough Corrib*, page 299.  

Country near Galway.—The Country east of Galway between the sea and the alluvial flat adjoining the Corribgalway river is, in a great measure covered by an irregularly embattled alluvial drift. The fragments and  

* The Friar’s Cut is remarkable, as evidently it is artificial, and seemingly was opened as a sea entrance to the lake when it was not made straight across the island is hard to conjecture. In the old or western side of Galway, there is no mention made of it, and it was evidently not made before the Friar had arrived. From its appearance it would seem as if it was begun from both ends at once, and that the workmen joined their work by a straight line. This would seem to suggest that originally it was only made for a boundary or brackish ditch, and that afterwards it was deepened and widened by the water flowing through it.  

† These are said for 150,000.  

45

holders in it are, for the most part, Limestones, but many pieces of foreign rocks were remarked, and Professor King, of Queen’s College, Galway, informs us that a little south of Mervue view he took out of it a block of Andesite similar to what he found on site in a vein in the hill S.W. of Lough Mask. Under the east embankment of Galway, there are two ridges of the drift or “drumlin” that run about N. 30° E., while under the suburbs called the Claddagh, south of the town, it is a drumlin that runs nearly N. and S.  

Extending into the S.E. part of the flat, along the Terrynish River, are ridges of rocky drift, that seem to be the boulder clay drift partly washed, and in the north-west part are small ridges of gravel. The latter seem remarkable for being nearly all together composed of the debris of granite and metamorphic rocks, as the drift about is not of this nature; however, as this valley formerly was one of the exits for the waters from Lough Corrib, this gravel may have been swept into it, being of a similar nature to that next to be mentioned. On the hill above, to the S.W. of Mervue, there are remarkable semi-box-like banks of granite gravel, and shingle, extending round the N.W. and S. sides of the hill. On the west side, it begins at the bifurcation in the road, immediately east of the small lake east of the village of Mervue, at a height of about 62 feet, and extends from that towards the N.E. for a mile, where it runs gradually round the hill and ends a quarter of a mile S.W. of Ballinduff Bay. To the north-west of the summit it spreads over a considerable part of the slope of the hill, a height of 152 feet being marked just above its margin. On the north-east and it is a well-defined alluvial beach, on the N.E. as an undulating gravel, while to the east on the slope of the hill it is in a sheet of height of 64 feet being marked near its south margin, and one of 172 feet on its short distance above it, and in the Terrynish quarry, Professor King drew our attention to a remarkable found of schistose flag of a similar gravel. This gravel was opened for a depth of over 50 feet, and may be considerably deeper. Opposite to these gravels on the hill, west of the river, there is a remarkable terrace covered with small mounds, that have a general north and south bearing. This terrace, however, seems to be a little higher than the gravel just mentioned, as there is a height a little below it on the north, of 115 feet, and one on it at the hamlet called Lettermore of 176 feet. Below it, at about 40 and 70 feet levels, skirting the high ground from Glenshane to near Shantallow is an undulating drift principally of granite gravel that often forms well-defined small mounds and ridges. These banks of granite gravel are very irregular, while those in the ballinlough of Newcastle have a nearly N. and S. bearing. Further north, north and west of Ballinduff are other gravel mounds and ridges, that are on ground from about 45 feet high to the sea level, those to the north being more or less irregular, and being nearly N. and S., while those to the west are very irregular, but still have a general similar bearing.  

Country east of Lough Corrib.—East of Lough Corrib, and north of the Corribgalway river flat, usually there is an irregularly undulating boulder clay drift, but in some places there is rocky drift, the latter occurring in the neighborhood of Woodpark, and from this, in places, east to Lough Aflour, where there is an E. and W.趋势 about three-quarters of a mile long, associated with it. Rocky drift will also be found N.W. of Lough Aflour, and in the country north of Ballinlough Bay. Granite erratic blocks are not peculiar in this tract, the most marked being a large block a little east of Barnasany, on the margin of the Cregg river flat, and another a mile further N.E., a little west of Lisheenamana.  

Country immediately west of Lough Corrib.—The low ground west of Lough Corrib is nearly altogether occupied by clays, undulating rocky drift, and bogs. Notwithstanding, there is boulder clay drift east of Ballymote Lough; between Moylunns Bay and Knocknacawley; in the neighbourhood of Gortin- 

claire Lough; and prions N. and E. of Ross Lake. Banked against the
boulder drift east of Knockatruhanally, there is a large deposit of fine quartzose sand of the kind usually called "rabbit-sand." The rocky drift is uneven and irregular, forming a very broken country, some of the contained blocks (limestone, gravels, and metamorphic rocks) being very large.

Extending from near the south shore of Owler Bay to the N.W. end of Rose Lake is an esker. It is continuous from a little S.W. of Owler, where it widens out, and extending northward from it are a few gravel dunes in the bog. West of Owler, detached gravel dunes and short ridges appear above the bog for about a mile, and further west the esker is continuous to the Galway and Oughterard mail coach road. The ground in the neighborhood of the esker is between 30 feet high at Gortshatlin Lake, and 60 feet in the neighborhood of Rose, being on much lower ground than that on which the esker in the central plain of Ireland usually occur; it also would seem to be of a more recent age, its formation being contemporaneous with the formation of the sea-bench (i) on the MacLochlin Hill, as the gravels forming them are similar. Moreover in gravel, that seem to be the same age, pieces of peat were found.

North-west of its west end, skirting the hill country, is an undulating drift mostly always gravelly; however, in a few places the boulder clay drift was observed, and in a gravel pit at Kilgallou a section is exposed that shows the marked difference between these two drifts (see Fig. No. 7). The drift

South-east of the west end of the Rose and Owler esker, there are also drift mounds and small ridges fringing the hills; they are more regular than those to the north-west having a generally N.W. and S.E. bearing, and only some being of the gravelly drift, while many are of the rocky drift.

To the N.W., at the foot of the eastern slope of Croagh-na-Cnooch, the gravelly drift is on ground between 120 and 80 feet high. S. of the drift there is a gravelly hill whose summit is 125 feet, while further S.E. a little north of Laghagstone, there are gravel and sand ridges on ground only 38 feet high, but it occurs up to 120 feet.

West of Rose Lake there is gravelly drift on ground 53 feet high and extending upwards to 230 feet. West of Downdid House, there is a well-marked terrace cut in the drift backed against the hill, as a level of about 124 feet. In the neighborhood of Moyullen no gravelly drift was remarked, the ridges and mounds being of rocky drift; but further S.E., in the neighborhood of Woodstock, the gravelly drift mounds again occur, and continue southward to those previously described at and to the S.W. of Glenloog.

From the above heights it appears many of these gravels may have been formed while the sea surface was on a level with the beach round the hill N.E. of Meallough Castle, those that are sharp and clean, partaking of the nature of eskers and gravel, may have been washed by the sea, while the clayey, may be those whose origin was solely due to the glacial streams.

In favour of this supposition it is found, that on the lower levels usually most of the gravelcore of the former nature, while all the upper levels are of the latter.

It was previously mentioned that on nearly all of the low tracts west of Lough Corrib, there is rocky or half-washed drift, and it ought here to be observed that this part of the district lies in the low valley of Ireland which extends from Kilud Bay north to the Shannon mouth on the south, skirting the high land of west Mayo, Galway, and Clare. (See Captain Lorcan's map to accompany report of the Local Tenure Commission, 1845.)

It therefore seems evident, that as the land rose, this ground, occasioned by the drift, to have been part of the land last under the sea, which may perhaps, account for its being nearly devoid of its envelope of drift, more especially if a current flowed over it from north to south, which does during the summer, for scattered over these bays there are numerous blocks, some of very large size, most of which seem to be the remains from the drift, and under some of these are patches of the boulder clay drift. These patches usually only occur under blocks, whose northern ends rest on the drift, from which it has been inferred that the drift was swept away by a current from the north; only one occasion to this general rule was observed; which occurs at the west margin of the

The river and stream from gravels are "white and turfed" from the amount of till carried down in them, and may not these five north in connection with gravelly valleys to the sea in the same way as stream valleys or near their mouths. See description of blowing sand on the Aran Islands, with suggestions as to their origin, Meenan Street 115.
Owes bay, where a large horizontal table-shaped block of limestone, about 15 feet square, rests on a pedestal of boulder clay drift. As the land rose the cliff at one time would have been affected only by the tide, and by these latter the other bar may have been formed, making the place of meeting of the north and south tidal waves. Many of the lower crags, evidently since they were deposited in their present sites, have been split into pieces; some observers suggest that these are blocks which were dropped from passing storms the force of their fall shattering them; this, however, does not seem satisfactory to account for their present condition, as some of these splitting blocks occur on drift, and before the force of the fall could have shattered them, it must have buried them in the drift, or the drift would have acted as a cushion to break the force of the fall. A good example of one of these split-up blocks on drift occurs immediately west of the coast road from Galway to Quinshard, due south of the S.W. arm of Doolinville Lough, and a little N.W. of Lough Acleagh; it now consists of eight blocks, each of which would fit into its fellow, and thereby show the original size. To test seems that as the joints in the rocks weathered, they filled with water, which during storms became ice, and thereby acted as wedges to split them up; more especially as in the hills to the west large blocks have been observed, which must have been moved from their natural beds by an exactly similar process.

The amount of the surface of the limestone rocks have undergone from atmospheric denudation can be learned from each of these blocks which lie on the wild crags away from human works, as under them the limestone has not weathered, and they now stand on low pedestals of rock. In cultivated land, and where they are near the fences across the crags, the pedestals are much higher as the natives have removed sometimes more than a foot in depth of the surface stones to form houses, etc., thereby apparently increasing the weathering. It should be mentioned that nearly all the smaller blocks lie along the open joint lines, while the larger ones are scattered promiscuously about; from this it would seem that after these joint lines were weathered, the smaller blocks were rolled about by water or some other force. On the eastern shores of the lakes there are more blocks than on the western. This seems to be due to the prevalent winds coming from the west, therefore the water acts upon and carries away the clayey matter in the drift, leaving the rocky residue on the eastern shores more than in other places.

The Hill Country.

On the hill country the drift is usually the boulder drift: on the hills and slopes over the rocky variety; while in the low valleys the sands and gravels may occur; however, on the ground south of Lough Corrib, patches of a boulder clay drift, in which the principal blocks are carboniferous limestones, are frequent in all the valleys that open to the north, and a similar drift is observed in the valley south of Knocknakeen, and extending to the sea between Spiddal and Furhugh. There are also drumlins of this kind of drift between Blackrock and Tura; the two mountains on the former place being called Knocknakeen and Blake's Hill; these bear about N. 25° E., and have their N.E. ends post drift gravel banks backed against them. The matrix of the boulder clay drift is very limy, and many of the contained blocks are carboniferous limestones; however, there are many blocks and fragments of granite, and metamorphic rocks, all of which were recognized as belonging to rocks in situ among the hills to the northward.

Professor King pointed out that near the base of the sea-cliff forming Blake's Hill on the S.W., there is a peculiar mass of a stratified sandy clay,* Knocknasallag is thirty-eight feet high, and Blake's Hill 105 feet; the cliff at the S.S.W. being forty feet high. South of Blake's Hill is a smaller drumlin, fifty-six feet high, called Illusas famine, seemingly entirely composed of the boulder clay drift, and having some similar bearings to the others. S.W. of Blake's Hill is a nearly N. and S. drumlin (N. 16° W,) called Knocknakeen, which slopes from the cliff (seven feet) southward, and has at its north point post drift gravel banks backed against it. In Knocknakeen drift section, the better beds of gravel, that seem to merge into the boulder clay drift, occur in the western part of the section. N.W. of the last hill in the neighborhood of Banna House, there seems to be a limestone drift. Further northward E. and W. of St. Owes' Cottage, there are shallow nearly N. and S. valleys where some of the previously mentioned patches of this limestone drift occur; those in the former being observed as far south as the hamlet called Towshack. In the valley extending southwards from Wotech, limestone drift also occurs in small detached patches, being observed nearly as far south as Drum Leagh, east. In the valley, S.S.W. of St. Kirkallan, detached small patches of this drift were observed near Follashanna, Corlessy Lynch, Corlessy Morgan, and at Hills, but in the last named place, the blocks and fragments of the limestones are not very numerous.

In the valley south of Knocknakeen, the patches of this drift extends nearly across the granite ground to the sea, however here also the drift becomes less limy, and the blocks and fragments of the limestone fewer as the deposit is followed towards the south. South of Knocknakeen at Folishe, Drimmavahaun, and Corwallintraum, the patches are rather extensive, being respectively at heights of about 250, 275, and 290 feet. Further south, in the neighborhood of Knock Longha there is good limestone drift, although in very small patches, and some of the contained blocks are so large that at first they might be mistaken for an outlying patch of the Carboniferous limestones; near Langhill there is limestone gravel worked for manure. S.S.W. of Langhill, there are N. 15° E. drumlines of drift in all of which fragments and small blocks of limestone occur, the drift being so limy that it can be profitably worked for manure. Hills in which this drift was observed occur at Gortgur, Knocka Leagh, Knock, and between that hill called Knockergaun. Of the latter hill, no section could be seen; however, it is noted—"the drift seems to be limy." but a little south south-west of Knockergaun is a small narrow drumlin, in which the drift does not seem to have any limy matter in it; but further south, a little north of the hamlet called Ballintra, there is another hill, where a few limestone blocks and fragments were detected. Further west, in the valley of the Bulke river, are detached drumlins of drift, some of which seem to be limy, more especially those in the neighborhood of Airdlero Lough, but as in none of these sections exposed, no limestone blocks or fragments were detected. The hills south and south-west bear N. 60° E. to N. 49° W.; the hills about Airdlero, and from that to Knocknakeen Lough vary in bearing from N. 52° E. to N. 25° W, and a small hill that lies about half a mile north of Bolks Lough, ranges N. 10° E. and S. 10° W. Still further west there are more hills, which occur in massive steeply undulating hills, that southward are inclined to have more regular features, while further south towards the sea-board, they occur in well-marked drumlins. In the neighborhood of Sween Lough, Finnean, and Staffanapollin, there are massive drumlins, all of which have more or less a coming of peat. These extend about half a mile south of Beal.

* As the boulder clay drift in all those valleys becomes less limy as it is traced towards the southwest, it seems to point to this direction, from the northeastwards, which is also the observed on the rocks in their vicinity, for particular see "Remarks" in the accompanying table of supposed ice-drift.

"When this extends below high water of tides it is full of phyllus."
In the Oughterard and Clifden valley the drift seems as if it was slightly modified by water, and of it the following note was made. - On the slopes of these hills, to the south of the valley, the drift above the 300 feet level is always rocky and rugged, and has on its surface, a layer below this level much of it is gravelly, and forming smooth hills. Fig. No. 8 is a sketch of some of the hummocks of rocky boulder drift on the north-east slope of Slieveanad. Joining the bog south of Lough Aasneen, are small ridges of clayey gravel, and in the high valley to the S.E. and S.W. of Gough-in-Clooch, there are small mounds of boulder drift, most of which bear about N. 70° W. On Gough-in-Clooch there are many large perched perphyritic granite blocks that must have been carried a considerable distance, the largest is 25 x 19 x 15 feet, at a height of 420 feet.

*See description of drift hills N.W. of Oughterard. Memoir, Ex. Sheet 96.
<table>
<thead>
<tr>
<th>County</th>
<th>Tract and Locality</th>
<th>Tract A</th>
<th>Tract B</th>
<th>Tract C</th>
<th>Tract D</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galway, 13-4</td>
<td>Pioneering [unclear] of Enock Woods</td>
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<tr>
<td>Galway, 13-5</td>
<td>Torrida, on the N.W. slope of the hill</td>
<td>X. 53 E</td>
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<td>Galway, 13-3</td>
<td>Glaigowra, a little west of Leugh Atrim</td>
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Note: The table above represents a portion of the text regarding the supposed ice strike. The entries include the county, tract, locality, and remarks. The table format helps organize the data, making it easier to read and understand the information provided in the text. The remarks column contains additional notes about the geographical features and conditions described in the text. This structured table format is particularly useful for summarizing and analyzing the data presented in the text.
<table>
<thead>
<tr>
<th>County</th>
<th>Township and Locality</th>
<th>Site A</th>
<th>Site B</th>
<th>Site C</th>
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<tr>
<td>Galway</td>
<td>44-4</td>
<td>Macquarie, on the west side,</td>
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<td>45-5</td>
<td>Lisnamore, N.E. of the Leagh.</td>
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<td></td>
<td>44-7</td>
<td>Derravale, at the summit, 265 feet.</td>
<td>N. 40 E.</td>
<td>N. 41 E.</td>
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<td></td>
<td>42-7</td>
<td>Derravale, near Lisnamore.</td>
<td>N. 41 E.</td>
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<td>42-8</td>
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<td>42-9</td>
<td>Laraguer, S.E. of Lisnamore.</td>
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<td>42-8</td>
<td>Derryvaght, north east of Knock-</td>
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<td>42-8</td>
<td>Carrowedilla, at the summit, 265 feet.</td>
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<td></td>
<td>42-7</td>
<td>Killaghlin, a little S.W. of the summit of Knockavulla, 372 feet.</td>
<td>N. 41 E.</td>
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<td></td>
<td>42-7</td>
<td>Killaghlin, S.W. part of townland.</td>
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<td>42-7</td>
<td>Killaghlin, north of Knockadilla.</td>
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<th>Site E</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>Galway</td>
<td>47-7</td>
<td>Down, summit of Knockaunmore, 460 feet.</td>
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<td>47-7</td>
<td>Knockaunmore.</td>
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<td>47-8</td>
<td>Fionnan, on east side of Knockaunmore.</td>
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<td>47-7</td>
<td>Fionnan, on west side of hill.</td>
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<td>47-8</td>
<td>Carrig, north west of Lough Gleen,</td>
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<td>47-8</td>
<td>Anrinn, and Knockaunmore.</td>
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<td>Knockaunmore.</td>
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<td>47-8</td>
<td>Knockaunmore, on the east side.</td>
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<td>47-8</td>
<td>Barogueen, Lough, Cockatubharr.</td>
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<td>47-8</td>
<td>Rooskeymount, at Lough an dui Siblick.</td>
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<td></td>
<td>47-8</td>
<td>Seavilmona, a little west of the summit, 265 feet.</td>
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<td>47-8</td>
<td>Seavilmona, a little further south, 265 feet.</td>
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<td>47-8</td>
<td>Seavilmona, a little further south, 265 feet.</td>
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Northwest slope of the hill all drained; however, the first site seems to have been cut out by ice coming from the west, and, especially so there are numerous large crevasses of the ice's complex. The site is steeper than the rock, and is cut from the hill. The site is cut at a height of about 400 feet, at the foot of the hill, and is a close figure to the rock. It seems that the ice coming down the valley was forced by the ice coming from the other side of the hill. The latter by an ice stream coming from the hills on the west. A remarkable line of cliffs at about an altitude of 400 feet, and giving it below is an outer ridge of rocky bedrock crest.
<table>
<thead>
<tr>
<th>County Map</th>
<th>Toponym and Locality</th>
<th>Note A</th>
<th>Note B</th>
<th>Note C</th>
<th>Note D</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>Galway, 62.4</td>
<td>Cloughmore, on the east side of</td>
<td></td>
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<td></td>
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<td>Cut by ice flowing down the slope into Galway Bay.</td>
</tr>
<tr>
<td>Galway, 53.4</td>
<td>Knock, at the south end of the lake.</td>
<td></td>
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<td>Rocks on shore, but no ice observed. About half a dozen large upright granite masses near the summit of the hill.</td>
</tr>
<tr>
<td>Galway, 51.1</td>
<td>Kilgarriff, Kilgarriff hill,</td>
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<td></td>
<td>Supposed to belong to the primary system of striae, similar to those in the country on the coast of Leenacurk.</td>
</tr>
<tr>
<td>Galway, 51.1</td>
<td>Kilgarriff, a little north of the village,</td>
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<td>Supposed to belong to the primary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<tr>
<td>Galway, 51.1</td>
<td>Kilgarriff, at the S.W. of the town land.</td>
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<td></td>
<td>Two large boulders, one of which bears N. 64 W. and the other N. 10 W. These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
</tr>
<tr>
<td>Galway, 51.1</td>
<td>Keanagh, near the north-east of the town,</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<tr>
<td>Galway, 51.1</td>
<td>Keanagh, at the old village,</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
</tr>
<tr>
<td>Galway, 51.1</td>
<td>Keanagh, at the boundary.</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<tr>
<td>Galway, 51.2</td>
<td>Lough, west of the village.</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<tr>
<td>Galway, 51.2</td>
<td>Loughl, at the road to Spiddal.</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<tr>
<td>Galway, 51.2</td>
<td>Kesh, near the salmon.</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<tr>
<td>Galway, 51.2</td>
<td>Corballis.</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<td>Galway, 51.3</td>
<td>Down, west, S.E. of Drumshanbo.</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<tr>
<td>Galway, 51.3</td>
<td>Drums, south, north of Drumshanbo, south of the village.</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<tr>
<td>Galway, 51.3</td>
<td>Corballis, on a bluff that rises about S.W. and E.E., a little S.E. of the village.</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<td>Galway, 51.3</td>
<td>Ballyha.</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<td>Galway, 51.7</td>
<td>Comeragh, Lough Egmore.</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<tr>
<td>Galway, 51.9</td>
<td>Loughmore, at the lake road.</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<tr>
<td>Galway, 51.9</td>
<td>Loughmore, at the lake.</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<tr>
<td>Galway, 51.7</td>
<td>Knocknemore, north of the wood.</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<td>Galway, 51.7</td>
<td>Traharnachappoole,</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<td>Galway, 51.7</td>
<td>Shalakeen, near.</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<tr>
<td>Galway, 51.7</td>
<td>Killeen, near, about Fallon.</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<td>Galway, 51.10</td>
<td>Ballynacrimb, on the sea-shore.</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<td>Galway, 51.10</td>
<td>Spiddal, on the sea-shore.</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<tr>
<td>Galway, 51.10</td>
<td>Shalakeen, near the sea-shore.</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<td>Galway, 51.10</td>
<td>Fallsh, on the sea-shore.</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<td>Galway, 51.10</td>
<td>Allihobanac,</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<td>Galway, 51.10</td>
<td>Knocklungeen,</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<td>Galway, 51.10</td>
<td>Crolleen.</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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<tr>
<td>Galway, 51.10</td>
<td>Ard, on the cliff S.E. of the village.</td>
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<td>These may be connected with the secondary system of striae, similar to those in the country on the coast of Leenacurk.</td>
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MINES, AND MINERAL LOCALITIES.

<table>
<thead>
<tr>
<th>County</th>
<th>Township</th>
<th>Mines</th>
<th>Properties</th>
<th>Agent</th>
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<td>Galway, 12 S.</td>
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<td>Galway, 12 S.</td>
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<td>Galway, 14 S.</td>
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<td>Galway, 15 S.</td>
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<td>Galway, 16 S.</td>
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<td>Galway, 17 S.</td>
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<td>Galway, 18 S.</td>
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The minerals of commerce observed in this district are Galena, Iron pyrites, Copper pyrites, Adelaide and Heavy Spur or Baryte; there is also Bog iron ore, which formerly was smelted for iron. Of the iron pyrites there are three or four varieties found: first, crystalline or acicular iron pyrites, commonly called Munde; second, bluish iron pyrites, called in this district Scaphar Munde; third, copperpy iron pyrites; and fourth, magnetic iron pyrites; the latter being here called Saltpeter ore; the two last are very poor ores, containing only a trace of copper. The Copper pyrites or Copper ore, and the Blende or Zine ore have not yet been discovered in large quantities; but in one vicinity the Barytes (Heavy Spur or Cass) seems to be plentiful.

Some of the mineral localities are in the Carboniferous limestones, but most of them are in the metamorphic or gneissic rocks; some of the minerals that occur in the Carboniferous rocks appear to be in true lodes, but rather in enlarged joints occurring in pockets and laminae patches. The minerals in the metamorphic and gneissic rocks occur in lodes, stringers, veins, and scattered through these rocks. In some silicified, the pyrites seem to take the place of the inos, and changes the rock into Pyritic schists, some of which, in the districts on the north, have been worked for this ore. Some of the lodes may be very ancient, and have been metamorphosed with the rocks in which they now exist, while most of them are much more modern, and have been subsequently formed; but all of

* The name Cass seems only to be applied to the compact variety of Heavy Spur.† See Geol. Manual Ex. Sheets 61 and 10.
them are older than the overlying Carboniferous sandstones and limestones. When these holes pass through the primary limestone, they always make Galena, in other cases iron and copper pyrites are the general minerals.

**The Kilmun Mines.**

These mines are in the Carboniferous limestones, and lie S.E. of Oughtersed near the Ferry of Knock.

**Carranclachlan (Galway 43).**—Thick calcite N. 10° W. lode, that contains at the surface iron pyrites and a little galena. A small trial was made on it in the basement that leads from the main road to the village. It is very massive where exposed in this place, and might possibly be a true lode; however, it bears with the course of the principal joints.

**Garvourie and Wormhool (Galway 52).**—A north and south lode, in which is galena, copper pyrites, iron pyrites, and blende. Two shafts were sunk about twelve fathoms deep, and in both good "tumblers" of lead found. An oblique lode is said to have been proved in the shaft behind the forge. A ten-horse engine was erected, but not being equal to the water, the workings were abandoned, and have not since been resumed (1863). Further north, in the townland of Wormhool, "tumblers" of lead are said to have been found.

**Part of the Oughtersed, West, Mines.**

**Cragy (Galway 44).**—In the S.W. part of this townland there is a strong mineral lode that runs N. 60° W. and hedges to the southwest. A private company (Messrs. Waddle and Co.) in the years 1865 and 1866, under the agency of Captain Boyd, proved it for a length of 300 yards, and that at the S.W. it was over eight feet wide without reaching the north wall. Captain Boyd, in a trial shaft at the S.W., found in it very rich copper pyrites, iron pyrites, principally muscovite, barytes with a little mohrinite and galena.

**Glashieburn (Galway 54).**—This is the continuation of the Cragy lode, but divided from it by a strong granite course. (See plan and section, Fig. 8.) Here some years ago works were carried on by Mr. Kelly, and the accompanying plan and section furnished by the present proprietor shows what has been done, and the minerals found. The lode is cut off on the west by a slide, to the west of which it has not been discovered. Near the S. of this townland, at the north-west of Lough Tawny, galena was discovered in a bed of crystalline limestone, and may point in a lode in the neighbourhood. In parts of this lode there are masses of Barytes that is often crystalline, but when massive it usually has through it long crystals of milky quartz.

* For copies of the plan and section of this working we are indebted to the present proprietor, his son, Mr. Burke, who, having visited them by a railway.

**Fig. 3.**

Plan and section of Clogh lode.

Explanation of plan and section of Clogh lode.

A.—A false head got here.
B.—A mass of baryte here.
C.—At the end of the crosscut there is seen the hanging end of a lode running in a westerly direction and dipping south. A small further trial has been made, and a good show of lead is said to be seen.
D.—A lode leaves here two feet wide. Dips E. at 50°.
E.—A lode at the end of cross cut, 3 feet wide, with 3 feet walk.
F.—Copper obtained here.
G.—Lead found in levels.
H. and H.—Lead found in three places by piling from the surface.

**Bunnag_AES (Galway 52 and 53).**—South-east of Lough Tawny there is a mass of minerals in the drift close to the new road, this may lie on the back or in the vicinity of a mineral lode. In the river that flows at the south boundary of this townland are lying veins of quartz and flue spie, with copper and iron pyrites. Trials were here made looking for a lode, but of course were unsuccessful.

The four following townlands are in the vicinity of the Glengowla Mines:

**Bashong (Galway 44).**—In the north part of this townland, south of the Glengowla lode, there are traces of galena and iron pyrites. Near the south of the townland, on the course of a north and south break in the rocks, there is a strong iron spie spring.

**Derryna (Galway 52).**—Near the east of this townland there is a strong spie, that seems to come from a mineral vein.

**Note.**—A Company called the Glengowla Company is being formed to work the minerals in the townland of Glashieburn, with the adjoining townlands of Bunnageen and Bunnakesen.

* The strong iron spie are recorded in these descriptions as they possibly may proceed from mineral lodes.
Durrow (Galway).—Traces of iron pyrites were observed in different places, more especially in the ravine north of the town of Lusby. In the east and west valley, through the centre of the townland, there are strong gas springs.

Leman, and (Galway).—Traces of iron pyrites.

The nine following localities are close to the boundary that divides the metamorphic and granitic from the Carboniferous rocks, but none of them extend into that never formation.

Doon (Galway).—Traces of iron pyrites.

Attakasahoon, Oranhill, Brownsville, and Gortanora (Galway).—In these four townlands traces of iron pyrites and galena were noted, usually in strings or wild lodes; at the main road that divides Oranhill from Brownsville, a small lode that contains iron pyrites and blende, can be observed crossing the road. A shaft of over thirty fathoms deep was sunk in the townland of Brownsville without cutting the lode; but as it was sunk on the south of the lode, and the lode hades north, it was impossible to cut it without driving, which we are informed was not done. In Gortanora, a small lode of iron pyrites was noted in the road cutting.

Ballagh, Borneamore, Achnahell, and Dungmoor Upper (Galway).—Traces of galena and irons were observed; but no regular lode.

The two following localities are in the suburbs of Galway town:

Townland (Galway).—In the vicinity of the Queen's College, a bed of pyrrhotite chert, containing magnetic (antiferrous) (1) pyrites and iron pyrites was noted.

Cappoamore (Galway).—Some trials, consisting of two short adits, and an open cast were made at Salihil, following some floating veins in the granite that contained a little galena. The adits are northward of the Eglington Hotel and the open cast on the sea-shore. No regular lode seems to exist, nor does it appear likely that any profitable work could be carried on in this locality.

The three following localities are in the vicinity of the north shore of Galway Bay:

Furboch (Galway).—Tumblers of vuggy quartz, with copper pyrites were found in the river and on the sea shore; but the parent lode has not been discovered.

Spailda, West (Galway).—Small veins with galena in the large rock at the west end of Tranmore (angles, big strand). These could scarcely be a profitable lode in this locality.

Elieve, West (Galway).—Small pits are said to have been sunk here about twenty years ago on a N. 8° W. lode, that showed traces of lead and copper. No traces of the lode to be seen at the surface, and the pit is full of water.

* In Sir R. Griffith's list of Irish mines and mineral localities, these workings are mentioned as being in the townland of Lusby.