

XXVII.—*Supplementary Observations to Dr. Berger's Account of the
Isle of Man.*

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IN laying before the Society the following remarks, I beg leave to state that my intention is not to attempt a minute description of the geological features of the Isle of Man, but chiefly to point out the localities of several formations unnoticed by Dr. Berger in his account of the Island, inserted in the second volume of the Transactions. With this view I shall not trespass on the time of the Society, by repeating the description of any place he may have already mentioned, unless where I have thought him too brief or erroneous; but, as I have sometimes found it necessary to differ from him, I must offer in my defence the information I have received from gentlemen of this Society, who have assured me, that his account was drawn up from loose memoranda, long after he had left the Island, when, probably many facts had escaped his memory. At the same time, having his observations before me, I was naturally induced to become more anxious in my research wherever I imagined there appeared to be any inaccuracy in his descriptions.

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The knowledge of the few additional facts that I now offer may tend to promote further enquiry into the structure of this Island; but much yet remains to be done before a complete account can be expected.

Dr. Berger himself admits his map to be faulty, and I was entirely destitute of the means of accurately correcting it; but some of the positions are so erroneously laid down as materially to affect what I have to communicate, and I therefore submit to the Society a rough sketch of the mountains (Plate 35¹), particularly of the central chain, which will, I hope, serve to convey at least a general idea of their disposition. The chief error in Dr. Berger's map is in the delineation of the southern group, the whole of which has been brought three or four miles too much to the east; by which means the road from Castletown to St. John's is thrown on the west, instead of the opposite side of South Barrule. Cronknyirrea-Lhaa also, as well as the mountainous ground stretching from it to Brada head, is made to rise about midway between the east and west coasts, instead of forming an overhanging cliff to the latter.

A central chain may be distinctly traced from north Barrule to Cronknyirrea-Lhaa, bearing north-east and south-west, a direction nearly parallel to the greatest length of the island. This chain includes most of the highest mountains, the tops of which are nearly in the same straight line, with the exception of Cronknyirrea-Lhaa, which lying rather to the north of this direction, gives the southern extremity a slight curvature towards the west.

As cursory observations require no particular method of arrangement, I shall follow that adopted by Dr. Berger, beginning with granite and gneiss.

Granite exists in much greater quantity in the Isle of Man, than appears to have been suspected by Dr. Berger, and may be traced

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further than he supposed it to extend, even where he mentions having found it. This was near the Dun, or as the Manks pronounce it, the Dtooden, a small harbour about three miles to the north of Laxey. A stream discharges itself here, and at a short distance from its mouth receives two feeders from the north, the most easterly of which is again subdivided into two courses, and it was in the southern branch of this that Dr. Berger perceived the decomposed portion of the granite he mentions. The different courses descend from a boggy land on the hill to the west, and run across the high road, but the main stream on the south is the only one of sufficient magnitude to require a bridge. Both branches of the northern feeder run over the granite as far down as their union, where it disappears. The southern branch, at one spot, runs through a vaulted excavation in its course below the road, where the rock is so soft as to admit of its being dug by the spade. If a westerly course be pursued up the hill from this spot, many places will be found where the bare rock is exposed for several yards square, and more particularly on some eminences near the top, where the soil has been washed away, and which are situate above the bog before alluded to, near the source of a stream which crosses the road about half a mile to the north, at Ballallen. It may also be traced towards the east, up the How, and though no good section is afforded in this direction, yet the disposition of numerous large blocks, unmixed with those of any other rock, sufficiently point out its extent.

This granite passes into gneiss, which is also in a state of decomposition in the excavation above mentioned, though the small portion denuded precludes the possibility of ascertaining its connexion with the granite, and confines the description to a bare exposition of the fact of its existence.

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Dr. Berger mentions the composition of this granite only at the spot where it occurs in a decomposed state; but at greater elevations it is perfectly compact, the quartz and mica bearing as large a proportion to the felspar as usual. The mica is black and the varieties of texture numerous, but it is impossible to trace with any degree of certainty the beds which constitute the different changes, as no very extensive section is formed in the rock. All that can be stated is, that the greater the elevation, the more compact and less decomposed the aspect; and on approaching the stratified rocks to the south, the mica gradually yields to chlorite, the quartz at the same time becoming less abundant, till some varieties are little else than felspar and chlorite.

If I have been prolix in my directions for detecting the locality of the granite here, it has arisen from the desire of leading future geologists to the spot without that loss of time which might otherwise attend their search. For it is situate between two streams not half a mile distant from each other, whose courses any inquirer would naturally be led to explore. On finding the dip and direction of the stratified rocks which form the bed of each to be the same, he would most probably conclude that they were parts of a continuous bed, and thus overlook the granite which occupies the intermediate space: a circumstance, which not only happened to myself upon first visiting the spot, but even, as I was informed, to a celebrated geologist, who was there the previous year.

The above is the only spot where Dr. Berger mentions having met with granite *in situ*; but another more extensive tract of this nature occurs to the south of Foxdale. The main body forms a hill or ridge, stretching nearly north and south for about one mile, and is called by the inhabitants "Slieu-ny-clough," or "the Stony Mountain." The best section of this is formed by the course of the river which

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runs through Foxdale, and there are also several places on its summit which are laid bare in a manner similar to those mentioned near the Dun. The stream affording this section rises on the eastern side of south Barrule, crosses the road between Castletown and St. John's near the sixth mile-stone, and after flowing through a small extent of boggy land, suddenly turns down the slope on the side of Slieu-ny-clough in a northerly direction. Another section is formed by a stream running on the same side, but down the opposite slope of the hill, and here the granite is soon lost beneath mica-slate, but towards Kirk Marown it once more appears at an elevation not so great as before.

The aspect of the granite forming Slieu-ny-clough is very different from that found near the Dun; the materials of which it is composed are in general large grained, especially towards the summit of the hill. On comparison with various granites in the collection of G. B. Greenough, Esq. it appears closely allied to that from Dalky, in Ireland, and also to some towards the southern extremity of Scotland, and it is worthy of remark, that these three localities are situate in nearly the same straight line.

On Slieu-ny-clough itself, I did not perceive any gneiss, but between this and Kirk Marown church, it occurs in a few places; at a hill about midway, behind the Garth, and close to the church. At these places it rises through the clay-slate presenting a bare rock in the midst of verdure. The felspar often greatly predominates; it then has a compact texture with a few spots of mica and quartz dispersed through it; the fracture conchoidal; the structure thick slaty. A similar gneiss is met with on Slieu-ny-carnaane. No section is formed in it, but it appears to lie in a bed penetrating the mountain in a direction about north-east by east. Broken masses occur disposed in an elevated ridge, and which, from the direction

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of quartz veins traversing several contiguous blocks, may be known to be still *in situ*. It will readily be conceived that the granite found in working the Foxdale mines, mentioned by Dr. Berger, page 36, was a continuation of that forming Slieu-ny-Clough, since the southernmost shaft is within gun-shot of the spot where we first meet with it denuded on ascending the course of the river.

QUARTZOSE DISTRICT.

By this title I wish to designate three localities, throughout which the prevailing ingredient of the rocks is quartz, and as I know not under what head to class them, I prefer giving a description of their appearance to hazarding a conjecture. No good section is afforded which might enable us to compare their connexion with the other formations, some quarries however occur at intervals which give us an opportunity of examining their structure, which in several places consists of quartz only, very crystalline and finely granular, and would deserve the name of quartz rock, were it not associated with other varieties. The first district to be mentioned lies between the Dun granite and Slieu-Roy, on which latter mountain many large blocks are scattered, which lie bleached on the surface, and at a distance present the appearance so commonly exhibited in granite regions. A section on the west of the mountain shews this rock intimately associated with the clay-slate in broad contorted beds, the composition here consisting of the same ingredients as granite in a very comminuted state; but the general character of the scattered blocks is that of a genuine quartz rock.

To the south-east of South Barrule and Cronk-ny-irrea Lhaa, the quartz is blended with mica and specks of clay-slate, sometimes with the latter only, presenting an intermediate passage between

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mica-slate and clay-slate. On Slieu-ny-Carnaane the appearance is similar, and as Dr. Berger notices the occurrence of blocks of mica-slate on this mountain, he probably considered the rock of which it is composed to be of that nature.

MICA-SLATE.

Two distinct varieties of this are met with on Slieu-ny-Clough. The first occurs in laminæ about an inch in thickness, where the Foxdale river bends to the north after leaving the Castle-town road. The surfaces are richly coated with mica, giving the specimen a brilliant appearance when detached from the bed. It is traversed by veins of quartz and schorl, sometimes crystallized in alternate bands.

The other variety is met with in two or three detached places lower down the stream. The rock has a greyish aspect, and consists of fine grains of quartz and mica intimately mixed with small crystals of schorl. Layers, one or two inches thick, of granular quartz, sometimes lie between contiguous laminæ, and inclose small reddish-brown garnets. Other layers have larger crystals embedded of a liver-brown colour. Although the bed of the river is sunk through this to the depth of ten or twelve feet, and we can trace both it and the granite along different portions of its bottom, the actual contact is no where visible, but is concealed by broken masses and rubbish.

CLAY-SLATE.

Dr. Berger divides this into clay-slate and greywacke-slate, and the latter does in fact appear to exist, though the gradation between it and the former is so insensible that it is impossible to draw the line of separation, and I have preferred designating the whole tract

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occupied by these under the name of clay-slate, the general character being that of the Cornish killas.

The gneiss near the Dun, passes into a chlorite slate very regularly stratified. The strata run north-east and south-west, dipping at a considerable angle to the south-east. A bed occurs here about twelve or fourteen feet wide, which lies between well defined strata, but is itself in a state of confusion. It appears to have once consisted of strata similar to those which enclose it, but which from some disturbing cause have been broken and bent in every direction at the time of their consolidation. A sketch (fig. 5, Plate 35.) of a portion of this ten feet in length, representing a vertical section formed by the stream at the Dun, will convey some idea of their disposition. It is much decomposed on the surface, having assumed a brown tinge to the depth of about one foot into the rock. A vein partly composed of clay, and partly of a steatitic substance united with a considerable portion of lime and a few specks of galena, traverses this. The bed may be traced from the road side a little beyond the bridge and along the course of the stream, about half way between the former spot and the sea, until it is lost there. Owing to the inclined position of the strata, connected with the rapid descent from the top of the hill to the sea shore, the real disposition of the bed has not a direction so nearly east and west, as the section formed at the surface might appear to indicate. It is from this bed lying conformably to the direction and dip of the laminæ of clay-slate, that I presume the strata and fissile texture are in this spot coincident. The clay slate on the western coast, between the northern termination of the red sandstone and Kirk Michael, does not assume that regularly slaty appearance which it presents on the opposite side of the island. There occur also in several places nodules of quartz sparingly dispersed, and

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near Balla Neah, I observed the cliffs to consist of angular fragments of clay-slate embedded in a clay-slate paste, and what is curious, these fragments are scarcely to be distinguished from the base excepting on the surface of the rock which has been exposed to the action of the waves, where they become sufficiently apparent by the fragments assuming different tinges of colour, giving the specimen a mottled appearance. One or two beds of magnesian limestone and iron pyrites occur here.

GREYWACKE.

Beds of greywackè occur in the clay-slate which do not lie conformably with the direction of the laminæ of the latter. The description of one will serve to convey a general idea of the others. On the north part of Douglass-bay at the top of the hill over which the road passes upon quitting the shore, is a quarry in which one of these occur. Two sections at right angles to each other afford a convenient opportunity of examining its position.

Fig. 1. Plate 35, is a section perpendicular to the direction of the strata, and fig. 2, parallel to them. The direction of the bed is nearly north and south (that of the strata being north-east and south-west,) and its dip is to the west. In one part it is seen traversing the clay-slate with great regularity, but in the other it becomes confused, and the schist passes insensibly into it.

On Peel hill there occur beds of a similar description; also between Port-le-Murray and the small patch of limestone to its south, and in the floor of a quarry at Port Eshee, may be seen a bed of a similar quality, and two others which apparently spring from it, intersect the slate in the manner represented by fig. 3. One of these is bounded by soft clay on one side and indurated on the other, whilst the other has the hard clay on one side, but on

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the opposite is in contact with the slate itself. These last mentioned beds separate into concretions bounded by remarkably plain surfaces, differing from each other in form, but which do not strictly resemble any geometrical figure. Indeed all these beds appear to possess the same property to a certain degree.

DYKES IN THE KILLAS.

Dykes, which may be termed Elvan, occur in the island. One, two feet broad, is seen near the Dun, rising through the chlorite slate, a short distance below the junction of the two streams where, it was stated, the granite becomes concealed. It is very variable in its composition, sometimes entirely quartz and chlorite.

On ascending Slieu-ny-Clough from Foxdale, along the bed of the river, there occurs a streak of granite, about one foot and a half wide, in the mica-slate which forms the west bank. No trace of it is seen on the east, but it agrees in character with a bump of granite to which it can be traced in the middle of the stream. It appears to affect the fracture of the greywackè bed above mentioned at Port Eshee. This consists of grains so exceedingly comminuted that we should scarcely be led to suspect its real nature from hand specimens.

LIMESTONE.

Dr. Berger has extended the limestone in his map too far to the north; the boundary lies in a direct line from Cass-ny-Hawin to Balla Salla. That which occurs at Port-le-Murray is also separated from the principal bed by an intervening patch of clay-slate.

In the immediate vicinity of the hill to the south of Athol bridge, the limestone encloses nodules of quartz, mentioned by Dr. Berger, p. 44. This may be traced thence, forming a broad band between Balla Hut and Balla Salla, and the appearances it presents lead me