36. *The GEOLOGY of the EASTERN CORNER of ANGLESEY.* By EDWARD GREENLY, Esq., F.G.S. (Read June 10th, 1896.)

CONTENTS.

	Page
I. Introduction	618
II. Careg Onen Slates	618
III. Baron Hill or Bangor Group	623
IV. Ordovician Series	626
V. The Carboniferous Rocks (and Dykes).....	628
VI. Glaciation	629
VII. Summary	631

I. INTRODUCTION.

THE observations recorded in this paper were made during a detailed survey on the 6-inch scale, by myself, of a small portion of Anglesey. It is my intention to continue the mapping of the island on the same scale.

I should like to express my thanks to former workers upon Anglesey, all those with whom I have come into communication having expressed the warmest sympathy with my undertaking; and in particular to my former chief, Sir Archibald Geikie, and to Prof. Bonney, who have aided me very substantially by generous loans of slides and specimens.¹ My friend and late colleague, Mr. Peach, has also, with his wonted goodness, looked over the graptolites and other fossils for me. Dr. G. J. Hinde and Prof. T. Rupert Jones have been so kind as to determine certain small organisms; and to Mr. G. J. Williams I am indebted for the photograph of the slates at Careg Onen.

II. CAREG ONEN SLATES.

The Carboniferous Limestone and Ordovician shales form the greater part of the cliffs about the cove of Careg Onen² (fig. 1), but near the western end of the beach we find, emerging from beneath the latter, a series of hard, greenish, fissile rocks dipping apparently at very high angles (figs. 1, 2 & 3). Careful examination, however, reveals indistinct planes of bedding, crossing the conspicuous divisional planes—which are really planes of cleavage—at various angles, and evidently much folded (fig. 4, p. 620). There are some lines of dark nodules following the bedding: some zones are gritty, and there are others of hard, compact argillite, scarcely cleaved, which contain a few oolitic grains.

¹ I am preparing an Index of Anglesey Literature, which I hope to make exhaustive. In these pages, therefore, passing reference only will be made to the principal papers on the area.

² Careg Onen is the name of the cove about $\frac{1}{2}$ mile north-west of Bwrdd Arthur. It has no name on any of the maps. This, and many other names desirable for reference, will, I hope, be soon inserted in new editions of the Ordnance maps.

At the base is a peculiar grit, a few inches thick, composed of quartz and detrital muscovite. Under the microscope certain round bodies are seen in it, of which Dr. Hinde writes:—‘The rounded bodies in the slide are undoubtedly sections of sponge-spicules, which are cut through some at right angles, others obliquely, and very rarely in the direction of their length. The dark spot in the centres of most of them is the axial canal of the spicule, now filled with some dark mineral. In some cases the spicules have

[Horizontal and vertical scale : 1 inch = 440 feet.]

a = Schists. | *c* = Ordovician Shales.
b = Careg Onen Slates. | *d* = Carboniferous Limestone.

[The bedding of *c* should conform to their base-line throughout.]

been squeezed out of shape. They are from .07 to .26 mm. in thickness. I cannot say to what group of siliceous sponges they may have belonged, for only these sections are to be seen. They are now of microcrystalline (?) silica of the same character as is usual with sponge-remains in Palæozoic rocks. They seem to be fairly numerous in the rock.’ (See fig. 5, p. 620.)

The slate and argillite also contain micæ, which often lie at right angles to the cleavage, and are bent. The nodules show no certain organic structures.

Near the western end of the section the schists rise suddenly from beneath these slates in a very sharp anticline (fig. 2), and disappear again before rising *en masse* to the west, where there is a sharp fold back, apparently torn out into a reversed fault thrusting the schists a little over from the west (fig. 3).

These slates are certainly unconformable to the green schists. Powerfully as they are folded, they are not in the least affected by the extreme and involved contortions of the schists, which are clearly seen to be truncated against their base. Their microscopic structures are also entirely different.

Again, the slates themselves appear to be, not a lower part of the Ordovician Series, but part of some older group separated from

Fig. 4.—*Folded bedding in pale green slates; fine gritty seams.*

In cliff above cave, fig. 6.

[About $\frac{1}{2}$ natural size.]

Fig. 5.—*Grit with sponge-spicules, Careg Onen.*

× 40.

that series by another unconformity. Indeed, I think that this junction, rather than that between the slates and schists, must be

Fig. 6.—*Slates underlying Ordovician shales at Careg Onen, Anglesey.*

Note.—The conspicuous divisional planes in the slates are cleavage, dipping N.N.W. at 65° – 85° . The bedding, which is much folded (see fig. 4, p. 620), is not perceptible in this view. The Ordovician shales are seen at the top of the cliff, dipping N.E. at 20° – 30° .

the unconformity noted by Mr. Selwyn (Ramsay, 'Geology of North Wales,' Geol. Surv. Mem. vol. iii. ed. 2, 1881, p. 223).

As seen from the beach (fig. 6, p. 621), the slates form a hard and well-marked feature (in which the sharp anticline of schist is included), over which pass the softer black shales, their bedding-planes dipping at very nearly the same angle as the top of the feature.¹ The discordance between their dip and the cleavage of the slates is most marked, the latter being nearly vertical. The strikes also are in different directions, the slates running E.N.E., and the shales at this point N.W. Moreover, though it is difficult to trace bedding for any distance in the slaty group, yet none of the beds, even when at high angles, pass up into the group above, or over the crest of the anticline, the schist rising nearly, if not quite, to the base of the dark shales. Most important of all, the cleavage of the green slates stops short at the base of the shales, which are quite uncleaved, even where seen, as at one place, actually in contact with the lower group.²

Now these shales are not hard or coarse beds which would resist a cleavage, but, it must be noted, are even finer and more susceptible of such a structure than the lower rocks which possess it in a high degree. Had the compression, therefore, operated at a post-Ordovician date, these dark shales could not have escaped, but would have received a cleavage readily, as even much coarser beds of that age have in the Caernarvonshire mountains.

The unconformity would seem, then, to be not merely local, but of systematic value. But if we have here a fragment of an older system, that system could not be later than Cambrian; and indeed, as no break so pronounced has been observed in North Wales between Ordovician and Cambrian, it would almost certainly be older still. The occurrence, therefore, of undoubted organic remains in these rocks is of great interest, as they would appear to be of pre-Cambrian age. Moreover, it would follow that the group of crystalline schists here seen must be assigned, both as regards their first formation and metamorphism, to a yet earlier period.

Experience has shown, however, that it is unwise to build too much upon the evidence of single sections, however decisive it may appear, especially when the rocks have been subjected to powerful earth-movements. There has been powerful movement here at two, if not three, distinct periods. Confirmation from other sections, or possibly from palæontological evidence, must therefore be looked for.

But unless such evidence contradict that which is seen here, it would seem that the crystalline schists of at least this region of Anglesey must be of extreme antiquity.

¹ The surface of the feature is marked by slickensides, which occur also in the schists; but the discordance cannot be due to movement of this kind. A false appearance of such movement has been produced in fig. 1 (p. 619) by my exaggerating somewhat the width of the anticline in the shales.

² Mr. G. J. Williams, F.G.S., kindly permits me to add that he concurs with me in this reading of the Careg Onen section.

III. BARON HILL OR BANGOR GROUP.

The stratigraphical importance of this group has been generally admitted since the discovery of the classical section in the Baron Hill drive by Prof. Bonney (*Quart. Journ. Geol. Soc.* vol. xxxix. 1883, p. 470): nor has any doubt been thrown upon his identification of it with the volcanic group of Bangor. To his admirable petrological description there is little or nothing to add.

The stratigraphical relations of the Baron Hill outlier have, nevertheless, remained in some obscurity; and therefore certain points which have come out in the course of the mapping will be of some interest.

Prof. Bonney considered it probable that the junction was faulted. Prof. Blake describes (*Quart. Journ. Geol. Soc.* vol. xlv. 1888, p. 463) a visible unconformity at the south-western end of the drive section. The lowest rock seen there at present, however, is the ashy grit; nor is anything else exposed in some bosses below the drive at that point, which must be some feet lower down in the series. Further, I would draw attention to the following points.

Prof. Bonney has remarked, with justice, upon the obscurity of the dips in the drive. The cuttings were then fresh, and probably the bedding has since become more distinct by weathering, though it is still inconspicuous. On careful examination a fine, even banding in the green argillites, with occasional sandy seams, can be seen, dipping steadily a few degrees W. of N. at angles varying from 30° to 90° , the average being high. Moreover, if any doubt remained as to the drive section, there can be none as regards some old weathered bosses along the top of the wood, where bedding with the same dip and strike is perfectly clear. The thickness, measured from these dips, would be not less than 1000 feet.

It will be seen that these planes strike almost directly at the N.E.-S.W. boundary (as well as at the strike of the adjoining schists); and if the structure be considered in relation to the form of the surface, it becomes evident that the outlier cannot be resting undisturbed upon the schists.

To explain this by normal faulting, however, would require very large faults, of which there is no evidence whatever on the coast to the S.W.; and which, moreover, the mapping of certain zones in the adjoining schists shows to be almost if not quite impossible, especially when the trend of the rock-features is considered. If there be any such faulting, it must, I think, be of small throw, and cannot extend all along the line. With regard to the E.S.E.-W.N.W. boundary, it is probable that there is a normal fault; but this must be a small one, as it does not appreciably displace a zone in the schists south-east of Murddyn Siglen. The northern boundary, however, is almost certainly a normal fault, running W.S.W.; of which there is evidence also in the featuring—a deep hollow in the hill-face, with a line of springs farther up.

It appears, therefore, that the Baron Hill outlier must be bounded by and resting upon a plane of somewhat exceptional nature.

Fig. 7.—Sections in the Baron Hill Group.

Third Boss on the Drive (from the west).

Fig. 8.

Fourth Boss on the Drive.

[Horizontal and vertical scale : 1 inch = 50 feet.]

Unless the beds are rapidly folded in boat-shaped isoclinal folds whose axes are inclined nearly parallel to the slope of the surface, they cannot be resting upon their natural base. This, however, is unlikely from internal evidence. The sum of the evidence seems to be in favour of supposing that they lie upon a dislocation-surface inclined to the N.E. at an angle rather steeper than the slope of the ground. This would give the form of outcrop which actually exists.

Turning now to the rocks seen in the drive, there is abundant evidence that they have been subjected to movement such as might be expected just above such a surface. They are, in fact, in the same broken condition as are those masses of Cambrian and Torridonian sediments which in the North-western Highlands are brought forward upon one of the major thrust-planes. The accompanying sections (figs. 7 & 8), on the scale of 50 feet to 1 inch, illustrate this. But they give no idea of the extent to which the fine argillites have been fractured. This is shown in fig. 9, which is taken from a spot $2\frac{3}{4}$ inches below the thrust at the point $\times$ in fig. 7. Further, along this very thrust-plane is a seam of material up to $\frac{1}{4}$ inch thick, resembling in every way the mylonites of the Highland thrust-planes. The same phenomenon is seen in several places. It was difficult to obtain material for slicing without defacing the surfaces (I hope that the section

Fig. 9.—*Face of cliff, $2\frac{3}{4}$ inches below the thrust shown at $\times$, fig. 7.*

Green banded argillite. Natural size.

' $\times$ ' will be respected); and slices have therefore been cut from specimens showing similar structure in the Tairfynnon Breccia near Bangor, which it was surprising and interesting to find. These show, under the microscope, perfectly typical mylonitic structures (fig. 10, p. 626).

The direction of movement is manifestly from right to left in the figures, but as these are not taken along the full dip, but along the crag-faces, it is probably from north-east or east.

With regard to relative age, the contrast of metamorphic condition between these rocks and the schists, on which stress is laid by Prof. Bonney, remains, I think, unaltered; though perhaps caution may be necessary in view of movements of the nature here described. If, however, as certainly seems most probable, these rocks are later than the adjoining schists, it is obvious that the overthrust supposed must be thrusting higher beds upon lower, a reverse of the usual effect. This, however, would follow if the angle of thrust were less than the dip of the beds.

The evidence here given would lead us to expect that a zone of

complicated structures, now concealed beneath the Carboniferous Limestone, may underlie the old rocks of Bangor and Caernarvon.¹

Fig. 10.—*Mylonitic seam in Tairfynnon Breccia.*

× 35.

IV. ORDOVICIAN SERIES.

The rocks of this age which fall within the district under consideration are almost entirely covered by Boulder Clay, and, towards the northern end, nearly,² though not quite, overlapped by the Carboniferous Limestone.

The best section is that on the coast at Careg Onen, where about 700 feet of black shale, with a few red bands, are seen (fig. 1, p. 619).

These have yielded a shell like *Obolella*, and a fragment of a trilobite (undetermined), as well as the fossils found by Prof. Hughes (Proc. Camb. Phil. Soc. vol. iii. pt. viii. p. 347); and inland, in some mudstones west of Bryn Poeth, I found some fragments apparently of phyllopoda.

The occurrence of a bed of pisolitic ironstone is alluded to by Ramsay ('Geology of North Wales,' p. 223). It does not occur at Careg Onen,³ but as, from evidence to be given below (see p. 628,

¹ I am unable to confirm the occurrence of another outlier of this group near Llanddona (Quart. Journ. Geol. Soc. vol. xlv. 1888, p. 465, and appended map): the rocks belonging, in my opinion, to the schistose complex.

² Their western boundary, which has been moved about $\frac{1}{2}$ mile westward in a recent map, was correctly drawn by the Geological Survey.

³ I do not think that the ironstone which there overlies the schists can be the same. It has not the same character, is only 6 inches thick, and its associated rocks are quite different.

'*Llanddona*'), it is clearly not dying out in that direction, it is probably cut out by the fault which throws down the Carboniferous rocks, and if so, the beds with the trilobite and *Obolella* must be below it. The obscure fossils hitherto found may quite well be Arenig forms, and therefore only the upper part of the shale-series can be upon any higher horizon.

An interesting point remains to be noted concerning the rocks among which the pisolitic ironstone lies at Bryn Poeth (fig. 11). These are not ordinary grits and shales, but bedded felspar-tuffs of varying texture, mixed with some sandy and muddy sediment. They are quite uncleaved. The finer bands approach very nearly to shales, but the coarser (fig. 12) are chiefly composed of broken lath-shaped felspars, most of them quite angular, and many even with re-entering angles, about $\frac{1}{10}$ inch in length. They are often wonderfully fresh and beautifully twinned. The

Fig. 11.—*Bryn Poeth Quarry.*
Section at the northern end.

Fig. 12.—*Felspar-tuff below pisolitic ironstone, Bryn Poeth.*

× 35.

matrix is dark, partly green by transmitted light, like that of the pisolitic ironstone, and contains also angular fragments of dark shale and andesitic lava, with generally a few pisolitic grains.

The pisolitic ironstone itself also contains a few lath-shaped feldspars. Though gradations exist, it does not pass imperceptibly into the tuffs, but occurs in a well-defined bed about 18 feet thick.

The section is a little obscured by small faulting, but there appear to be tuffs above and below. The whole series is about 50 feet thick, and probably lies in a gentle synclinal fold.

It is clear, therefore, that we have here a record of a volcanic episode contemporaneous with the latter part of the great Arenig eruptions of Merionethshire. And it would seem to be due to a separate outburst in this region, and not merely wind-borne from the south, otherwise the pisolite and shale could hardly be so free as they are from volcanic material.

(I may add that, in the *Didymograptus*-beds at Caernarvon, I found beds of very similar tuff, lying as hard ribs among the dark shales at Pont Seiont. I have failed to find any, however, in the shore-section east of Port Penrhyn at Bangor.)

There is no perceptible cleavage, but there has been powerful earth-movement, the shales at Careg Onen folding over, and plunging against the schists of the western end of the section.

Llanddona.—A tract of Ordovician shales must exist, almost entirely concealed by Boulder Clay, skirting the coast for about $\frac{1}{2}$ mile on either side of Llanddona Church, and extending about $\frac{1}{3}$ mile inland.

While mapping the drift-covered slopes I observed a great number of blocks of black mudstone, along with which were also many of pisolitic ironstone, and the drift itself was full of small angular fragments of black shale. At last two small exposures of shale, like that of Careg Onen, were found at Corn-ud. They dip W.S.W. at 25°, and are probably faulted against the schists.

I think it is safe to assume that this area is occupied by such shales (its featuring, moreover, is quite unlike that of the schists), and have therefore inserted it on the maps.

One or two of the boulders have yielded graptolites—‘*Climacograptus*, of a type that occurs in the Llandeilo-Caradoc rocks,’ Mr. Peach writes, adding that he ‘should think they belong to *C. bicornis*, but, without seeing their proximal ends, would not like to say anything further.’

V. THE CARBONIFEROUS ROCKS.

These rocks are noticed briefly in Ramsay’s ‘Geology of North Wales,’ pp. 258–59. They present some points of general interest.

The prevailing type is a light grey, rather crystalline limestone; but there are many interesting varieties, particularly a thick mass of brown dolomite with pyrites and other heavy minerals.

Most striking, however, are the sandstones and conglomerates which occur near the East Point, and at Seiriol and Fedw Fawr, near the middle of the area. They are about 90 or 100 feet thick, and consist chiefly of very fine white sandstone, with pyrites and carbonaceous particles, and partings of soft grey shale. Obscure

plant-remains abound. At their base is a strong conglomerate about 20 feet thick, composed of vein-quartz pebbles with many of red jasper and green schist, as well as of limestone with Carboniferous fossils. Another conglomerate, less persistent, occurs higher up in the group. So far as faulting, which near the East Point is very frequent, permits one to judge, these groups of Seiriol and Trwyn-du appear to be on the same horizon (a thin conglomerate near Llangoed is much lower down); though perhaps not accurately so, as in certain sections pebbles and sand can be seen to come in on the same horizon as pure limestone.

Dark shales occur at all horizons, but are generally very thin. One of the thickest (about 6 feet) contains some small ostracoda. Prof. T. Rupert Jones refers them, doubtfully, to a small ovate form, probably *Leperditia acuta*, adding, however, that if a feature suggestive of a ventral rim or margin be really such, he would be unable at present to determine the specimens definitely.

The thickness of the whole series appears to be about 700 feet. 'Brecciation' is not uncommon in some of the limestones, quite unconnected with faulting, and appears to be really an early stage of dolomitization, the change proceeding along the cracks.

The unconformable relation to the underlying Ordovician Shales is well seen at Careg Onen (fig. 1, p. 619). The lowest beds seen—about 20 feet from the base—are dark limestone with shaly partings, and there is no sign of a conglomerate.

Dykes.—Three dykes mapped in the Baron Hill Rocks show a matrix exactly resembling, under the hand-lens, that of the andesitic dykes described by Mr. Harker (Geol. Mag. 1887, p. 409), with which also they agree in trend and general relations. There is no reason to separate them from that group, arguments for whose Carboniferous or post-Carboniferous age have been given by previous writers. A good many have been already mapped in the schists to the west, but their relations—which are interesting—will not be dwelt on in this paper. The dyke noted by Prof. Bonney (I trust, with him, that the ice-worn surfaces will be scrupulously respected) is quite thin, about 2 feet wide. The optical characters of its porphyritic crystals indicate a felspar allied to labradorite. There is also a dyke, about 12 feet wide, cutting the lowest boss of ashy grit in the drive.

VI. GLACIATION.

(a) *Striation.*

Striæ are rare, except on the Carboniferous coast-line where the drift has been but recently removed.

The prevailing direction is S.S.W., or a few degrees W. of S., except in a district lying east of a line drawn from Dinmor Point to Trwyn Penrhyn, in which there is cross-hatching with a series running S.S.E. Where they can be compared, the S.S.W. series can be seen to be the later.

Local deflections through as much as 40° may be observed on rock-faces no more than 3 feet high.

There are large glacial furrows in a few places.

Rock-bosses are generally moutonnés, on the N.N.E. side.

(b) *Drifts.*

The drift is for the most part a typical, tough, brown Boulder Clay, full of well-striated stones.

It is very thick in the Vale of Llanfaes, probably not far from 100 feet, fine sections being seen on the coast between Penmon and Beaumaris (Ramsay, *op. cit.* pp. 275-76). There is none on the Carboniferous escarpment, but it thickens gradually on the dip-slope, where there is one valley buried to a depth of 60 feet. The brow formed by the schists is also free from drift, which, however, again begins to fill hollows in the plateau to the westward.

A great thickness of Boulder Clay comes in again near Llanddona Church, where it forms cliffs about 50 feet high. Below Ffynnon-oer this Boulder Clay suddenly rises to the 200-foot contour, forming an inland cliff which must nearly follow a concealed rock-feature. There has been much land-slipping here, probably upon buried Ordovician shales.

Such boulders as can be identified with local rocks have travelled S.W.-S.S.W., a direction agreeing with that of the striæ. Boulders from the Welsh mountains have only been observed at Penmon; but rocks foreign to North Wales are abundant.

The gravels associated with the drift along the Lleiniog shore have been described by Ramsay, who notes their semi-consolidated state. They contain faintly-striated stones. Similar gravels occur at Llanddona.

About Llanfaes there is a singular stoneless (or nearly stoneless) red clay, as much as 10 feet thick. Its relations are not exposed.

These phenomena seem to me to be best explained by the theory of a confluence of bodies of glacier-ice coming from the north and from the Caernarvonshire mountains respectively. Not only does it explain the general south-westerly deflection of the striæ and boulders, but I think that the cross-hatching in the Penmon area can also be understood by means of it. In that area complications must have occurred. The influence of the great Ogwen glacier must have been much less than it was farther west, and the glaciers of Aber and Llanfairfechan only would have opposed the northern ice. On comparing the extent and height of their catchment-basins I doubt whether their combined force would amount to more than a quarter of that of the Ogwen glacier. That they did offer opposition is clear, for they extended at times as far as Penmon. But fluctuation in the masses of the northern and southern streams would enable the larger stream to pass on undeflected, especially if some fluctuations did not affect both at once, which might well happen—as their sources were so far apart. The local influence of some high ground at Dinmor Point (west of which, moreover, there is an

extreme deflection to W.S.W.) would then come into play, and cause the S.S.E. deflection. Moreover, the Llanfairfechan glacier, being the feeblest, would be the first withdrawn, and the Aber glacier would then rather aid the S.S.E. deflection than otherwise.

VII. SUMMARY.

The south-eastern promontory of Anglesey consists chiefly (besides the schists) of Ordovician and Carboniferous rocks, overlain by extensive Glacial deposits; but there are also two small but important fragments of ancient formations at Careg Onen and Baron Hill.

The slates of Careg Onen rest unconformably upon the schists, and appear to be separated by another strong unconformity from the Ordovician shales. Whence it would appear, pending confirmation from other sections or direct fossil evidence, that the slates (which contain sponge-spicules) must be of pre-Cambrian age, and the schists themselves even older.

The ashy grits and bedded tuffs of Baron Hill appear to have been moved somewhat from the N.E. along a plane of overthrust. They are traversed by planes of mylonization, as well as isoclinally folded, and in general much broken up.

The Ordovician rocks consist chiefly of dark shales and mudstones, sparingly fossiliferous, but contain a group of volcanic tuffs on the horizon of the pisolitic ironstone. Another tract of Arenig beds, with the pisolitic ironstone and graptolitic shales, lies concealed beneath glacial drift at Llanddona.

The Carboniferous rocks appear to be about 700 feet thick. They contain 100 feet of conglomerates, sandstones, and shales, with plant-remains, about the middle of the series.

The glacial striæ sweep round from S.S.W. at the northern to S.W. and W.S.W. at the southern end of the district. In the Penmon area there is cross-hatching with a series running S.S.E., and it is suggested that this is due to fluctuation in the power of the Caernarvonshire glaciers to deflect the ice coming from the north, combined with the local influence of certain high ground.

DISCUSSION.

Sir ARCHIBALD GEIKIE rose, not for the purpose of criticism, but to congratulate the Society on the acquisition of a geological recruit who, possessing leisure, enthusiasm, and capacity, was likely to advance the progress of geology in this country. Notwithstanding all that had been written regarding the geology of Anglesey, the subject still bristled with difficulties. Unsolved problems presented themselves in every part of the island. These could never be settled by mere hurried holiday visits, but needed such patient investigation as was demanded in the preparation of a geological map of the district on a large scale. The present paper, and the little piece of

mapping which accompanied it, were no doubt an earnest of what might be expected from the Author, who would carry into his labour the habits of minute and accurate observation which had distinguished his field-work when he was a member of the staff of the Geological Survey.

The PRESIDENT said that he was pleased to find that Mr. Greenly had undertaken to work out, with so much care, the geology of Anglesey. There were many important points in connexion with the crystalline schists and the overlying rocks which needed elucidation; but he was glad to find that the Author agreed with the speaker and others that the crystalline schists were of pre-Cambrian age and overlain unconformably by the Palæozoic rocks.

Prof. G. A. J. COLE congratulated the Author on picking up the history of Welsh vulcanicity in Anglesey, and on the discovery of a volcanic deposit on the horizon of the pisolitic ironstone, in addition to the more conspicuous and better-known areas of Cader Idris and Rnobell-fawr. He also compared the conglomerates containing blocks of the contemporaneous Carboniferous beds with those on the opposite Irish coast north of Rush, which occur along the junction of the Carboniferous Limestone and the old Ordovician shore.

The AUTHOR expressed his thanks to the Society for the manner in which the paper had been received.