Glaciation of the Northern Part of the English Lake District. *Quart. Journ. Geol. Soc.* vol. xxix. p. 422.

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IV.—THE DEVONIAN QUESTION.

By A. CHAMPERNOWNE, M.A., F.G.S.

IN last month's GEOLOGICAL MAGAZINE there is much (by three writers) that bears upon the Devonian Question, and I would now add a few words on the same subject, which is of the greatest interest to me.

In the first place, notwithstanding that two of the writers are my personal friends, I think that the united criticisms upon Prof. Hull's proposed classification exceed what the nature of the case calls for, as that scheme contains the most essential elements of truth. I have myself been in North Devon during the last autumn with Mr. Ussher, and we hope to give a further account of our work and the conclusions arrived at. My chief object in going there was to test certain opinions I had before expressed with great confidence (in these pages and elsewhere), and, as a result, I have proved to my satisfaction that those opinions were wrong.

Neither by fault, nor inverted junction along the line indicated by Jukes, is there any wholesale reduplication of the North Devon Series. The fault I had already taken to be disproved by Mr. Etheridge's paper (*Q. J. G. S.* 1867). In the last paragraph of Mr. Kinahan's paper he observes, that "Jukes' fault has not been disproved, and that the Irish geologists who have been in Devon believe in its existence." This, however, from Prof. Hull's classification, is evidently not his opinion, as he places the Ilfracombe and Morte slates beneath the Pickwell or (Upper) Old Red Sandstone, but he suggests an unconformity at the base of the latter, of which there is no evidence.

Regarding the Pickwell as what Mr. Kinahan aptly calls the Carboniferous Old Red, I will venture to say that in nine out of ten Western European areas a break¹ might be expected at a corresponding horizon, but the North Devon marine sequence is almost unique in its completeness. My former belief in an inverted passage assumed perfect conformity at that junction, and of this conformity there are indisputable proofs.

¹ Of all areas in which rocks belonging to the Siluro-Carboniferous interval are developed, that of the Welsh border counties, although geographically the nearest, is perhaps the least comparable of any to the North Devon area, and the greatest stumbling-block to a would-be "Devonian" disciple. In vain may be the search there for a break of any magnitude to be filled in from the latter area. Lacustrine conditions may have prevailed more or less, from the final retreat of the Ludlow types, until the waters of the Lower Limestone Shale united the "Welsh Lake" (see Prof. Geikie's Lectures on the Old Red Sandstone) with the ocean. In South Ireland and Devonshire, on the other hand, there are plain indications of an open sea to the South and East, extending into the Rhine country.

The absence of a "Middle Devonian" (with its peculiar forms of life) anywhere in the United Kingdom, save North and South Devon only, was enough to stagger one and shake one's faith in fossils; and no unconformity in the heart of the Old Red Sandstone districts appeared originally to me to be sufficiently significant to explain its absence. Nevertheless, the rock groups north of the Pickwell Series *are* unquestionably distinct from those south of it.

With regard to Mr. Hall's expostulation as to there being no fossiliferous "Upper Devonian" in Prof. Hull's scheme, that surely is a question of nomenclature, and, expressive as the local names 'Marwood' and 'Pilton,' 'Baggy,' 'Cucullæa zone,' certainly are, I think that the only philosophical classification ultimately attainable will be to drop the term "Upper Devonian" as applied to these beds altogether, or regard it simply as a synonym for Lower Carboniferous, in cases where that period is not represented by good Carboniferous Limestone. In this respect I still think Jukes was undoubtedly right. Therefore I would apply the term Devonian as high as Prof. Hull applies it, regarding the Pickwell as the conformable base of the Carboniferous. This will still leave us the great Ilfracombe-Morte Series as Devonian, and the Linton grey beds as a *lower* fossiliferous Devonian.

The presence of land-plants of Carboniferous genera in the Marwood beds would be in harmony with this view, and the great profusion of a *Productus* in the gritty beds of the Pilton Series at Croyde Bay, etc., would make it probable that they represent (in time) the lower parts of the Carboniferous Limestone.

There are not wanting signs that Prof. Hull's suggestion about the Silurian affinities of the Foreland Sandstones *is worth a great deal*. In the red and variegated beds of the Lincombe Hill, etc., exposed along the New Cut at Torquay, Mr. Lee and I found many portions of *Homalonotus armatus*, Burmeister. The genus *Homalonotus* being essentially Cambro-Silurian and Silurian, suggests at least that these beds, which contain also *Chonetes*, *Holopella* and a small *Myalina*, may have some Silurian affinities, and may be as low as the lowest North Devon beds. At the same time there are among them some grey red-speckled siliceous grits with superficial raddling, which resemble those of the Hangman Series, and as the South Devonian rocks are not nearly so complete as those of North Devon, it is quite possible either that the true Hangman Grits may be absent, or that beds belonging to the three lower groups of the North, Foreland, Linton, and Hangman, may be somewhat inseparable in the South; the Meadfoot grey and brownish grits and schistose beds might well represent the Linton. Great N.W. and S.E. faults, shifting an earlier set of fissures, cut out parts of the series in the Torquay Promontory.

As a matter of pure speculation, I see no reason why the *Homalonotus* red flagstones of the Eifel district should not prove to be a Silurian rock rising from below the Coblenzien (Lower Devonian) of Daun, Prüm, etc.

To resume then: I believe Sir Roderick Murchison¹ was right as

¹ *Siluria*, 4th edition, p. 282.

to the comparative structure of South Ireland and North Devon, and that the great unconformity shown in the centre of Mr. Kinahan's woodcut (*GEOL. MAG.* 1879, February No. p. 68, Fig. 1), represents the missing Eifelian system; missing in South Ireland, not from denudation, but from having never been deposited in that region. The Glengariff and Dingle Grits would therefore have been upturned and denuded, and remained land or shoal water during the time that the Ilfracombe-Morte Series was accumulating in a steadily subsiding area, which is now North Devon and West Somerset.

I have crossed the mountainous country from Macroom to Killarney, which route affords grand sections of these massive grits, so that their characters are somewhat known to me, and I know them also on the Upper Lake of Killarney, and at the Gap of Dunloe.

Taking all into consideration, the conclusions of Prof. Hull appear to be in the main legitimate deductions from the facts, and not mere theory.

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V.—THE DEVONIAN QUESTION: REPLY TO MR. KINAHAN'S NOTE.

By Professor E. HULL, M.A., F.R.S., etc., etc.

IN the *GEOLOGICAL MAGAZINE* for February will be found a "Note in Press," appended by Mr. Kinahan to his paper on the "Silurian Rocks of Ireland," read some time ago before the Royal Geological Society of Ireland, and which I had an opportunity of hearing and replying to. On that occasion I pointed out some of the numerous defects and erroneous views which this paper contains; and I could have wished that the matter had rested here, because I consider it highly unbecoming that the Director of the Survey should enter into a public controversy with one of his staff on points connected with the geological structure of the country which has been entrusted to him for elucidation. On the English and Scotch Surveys such conduct is happily unknown, and however the field surveyors may differ amongst themselves, and maintain their opinions in print, there has always existed a sufficient feeling of respect for the heads of the Survey, as well as a just consideration of the interest and credit of the Survey itself, to prevent open controversies with the heads of the Survey in the public prints. To this rule Mr. Kinahan presents the solitary exception. I cannot take blame to myself for having provoked the "Note in Press" to which I have referred, because there is nothing in my paper, published in the *GEOLOGICAL MAGAZINE*, Decade II. Vol. V. 1878, p. 529, to call forth the statement on the part of Mr. Kinahan that I had made "various errors in reference to the Irish rocks."

If, then, I depart from the rule I have followed for several years in reference to Mr. Kinahan, of passing over his unseemly language in silence, it is with the understanding that this rule will be adhered to on all similar occasions, and that my silence in the future must not be construed into acquiescence, either in his statements of supposed facts, or his conclusions.