THE CALDER VALLEY.

SIR,—Mr. Davis's paper on the Valley of the Calder, in the number of the GEOL. MAG. for November, 1878, is sure to be widely read; but I fear that some points in it are likely to be misunderstood by beginners in the study of geology. This must be my excuse for troubling you with any remarks on it, and I trust that my friend, the author, will for the same reason forgive any criticisms of mine.

Take the following sentences with reference to the Pennine Anticlinal and Blackstone Edge, viz.: "The thick beds of gritstone and shales were crumpled up like the leaves of a book, but being of a hard and very inelastic nature, the grit rocks were broken asunder, and we have the two faces of the separated rock considerably apart, in some instances the distance has to be reckoned by miles;" and again, "As the strata were successively strained and broken, they would gape wide apart at the centre of the arch; each bed of sandstone or shale, as it became elevated to the surface, would carry those which had preceded it further and further from the centre of rupture."

I think that these remarks are very apt, as they stand, to mislead young students into thinking that the opposing escarpments of each bed of grit, etc., as shown in the diagram, once *touched each other* along their *present faces;* and that the vacant spaces represent a gaping fissure instead of so much material removed by denudation. Of course, Mr. Davis does not mean this, but I fear that many readers will think he does.

Again, with reference to Stainmoor and the transport of granite boulders, we read that a branch of the great glacier "passed over Stainmoor into Wensleydale." Now, the pass of Stainmoor does not lead into Wensleydale, but into Teesdale. Wensleydale must have been written by mistake for Teesdale. But further, there are no granite boulders in Wensleydale. The whole discussion as to the transport of Shap granite boulders into East Yorkshire turns upon the fact that they did *not* travel by way of Wensleydale, but crossed over the lofty pass of Stainmoor, and that at such an elevation that there was nothing to prevent their also getting into Arkendale, and so into Swaledale, had they gone over on floating ice, as so many geologists have maintained. With reference to this I would refer to Mr. Goodchild's map and paper on the "Glacial Phenomena of the Eden Valley" (Quart. Journ. Geol. Soc. 1875, vol. xxxi. p. 55).

I do not know what river base Mr. Davis refers to as being "not far distant" from the Calder Valley; but, as to the latter valley having been submerged when the erratics found in its gravel, were transported thither, I wish Mr. Davis would give us his reasons for so thinking.

It would be a very interesting fact were it established or even rendered probable that the Calder Valley was submerged when its gravels were deposited; but I should like to hear the reasons for it before accepting it. The said gravels did not appear to me, when I was working in that country, to differ from ordinary river gravels; nor do I think it at all necessary to introduce the sea to account for the erratics found in those gravels; for the glacial drift with erratics

lies on the Lancashire side so high on the hills close up to the watershed, and so much above the summit level of the low pass between Todmorden and Rochdale, that I think erratics may very well have been washed down out of the glacial beds into the Calder Valley by ordinary rain and river action.

I am also puzzled by the statement, "You may always be sure that, wherever heather and peat occur, the rock below the surface is sandstone. You will never find the heather growing on a bed of limestone, or shale, or clay, but always on sandstone." I have myself noticed that peat is very often, not to say generally, underlain by a bed of yellowish clay, which forcibly reminded me of the underclay of a coal-seam.

J. R. Dakyns.

H. M. Geological Survey, Bridlington Quay.

CHLORITIC MARL AND UPPER GREENSAND.

Sir,—Will you allow me to make a few observations in reply to Mr. C. J. A. Meÿer's "Notes respecting Chloritic Marl and Upper Greensand," which appeared in the Geological Magazine for December, 1878.

Let me in the first place thank Mr. Meÿer for pointing out the probability that Captain Ibbetson included two distinct beds "in actual contact, but *widely separated in age*," under the term Chloritic Marl. The idea had not occurred to me, and I have not had an opportunity of refreshing my recollection of the Isle of Wight sections since I took up the question of the Chloritic Marl; it would seem, however, to be a very probable supposition, but assuming it to be correct, I fail to see how it improves Mr. Meÿer's position. On the contrary, it appears in my opinion to form a still greater objection to the classification proposed in his paper on the Cretaceous Rocks of Beer Head.

Mr. Meÿer maintains that he was correct in correlating beds 10 to 12 of that section with Ibbetson's Chloritic Marl, *i.e.* with what he himself defines as embracing "the (local) top of the Upper Greensand and the (local) bottom of the Chalk Marl of the Isle of Wight." Now, granting for the moment the correctness of this correlation, he has surely committed himself to a classification that cannot possibly be retained. If, indeed, these are the beds which were originally united under the name Chloritic Marl, it becomes very clear that such an application of the term cannot any longer be admitted, and with it, therefore, must fall also Mr. Meÿer's nomenclature.

Whatever was the original signification of Chloritic Marl (and I think the question is likely to remain rather obscure), I still believe that it was the glauconitic base of the Chalk Marl only to which the term was applied by most subsequent observers. Mr. Meÿer must excuse me for pointing out that the instance he gives to the contrary hardly goes for much, since Forbes was associated with Ibbetson in the original description of Chloritic Marl, and the memoir referred to was written by Forbes in 1850, a year only after the publication of Captain Ibbetson's Notes. It is possible, however, that the Chloritic Marl of the Geological Survey Memoirs, issued in 1862,