

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.

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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,

was the same as that of Captain Ibbetson, but more recent writers have certainly taken it in the more limited sense.

Again, Mr. Meÿer asks, "was I wrong then in suggesting the separation of beds 10 to 12 from the Upper Greensand, and applying to them the term Warminster Beds?" Now, there are two questions involved in this sentence which should be carefully distinguished. These are—

(1). The separation of the said beds from *the rest* of the Upper Greensand.

(2). Their separation from or inclusion in the formation usually known as the Upper Greensand.

As regards the desirability of the first, we are all agreed, and Mr. Meÿer has been duly credited with being the first to recognize the distinctness of the fauna.

With respect to the second point, it depends of course on the application and definition of the term "Upper Greensand," and I confess that I do not see the force of Mr. Meÿer's reasoning on this head.

Surely, if we are to retain the name Upper Greensand at all, it should include all the strata which follow, in unbroken succession, from the top of the Gault (wherever that line is drawn) to the base of the Chalk Marl, where there is a distinct break in the series. This was its original application, and if we have eventually to recognize more life-zones than those at present indicated, why may they not all be included under the one comprehensive term?

Mr. Meÿer distinctly limits the "true Upper Greensand" to the strata between the Blackdown and the Warminster Beds, thus reducing it to mere zonal importance. I contend, on the other hand, that it is better to retain the name in its original signification, and to give it the rank of a divisional formation.

The answer to Mr. Meÿer's second question is, I think, contained in his own "Notes." He asks, where is there a Warminster fauna in the Upper Greensand? The answer is given at the bottom of the same page; speaking of the conglomerate occurring on the line of division between the Upper Greensand and Chalk Marl; near St. Catharine's Down, he rightly says that it divides two faunas, "the lower of which includes *Pecten asper*, *Terebratella pectita*, *Catopygus columbarius*, *Galerites castaneus*, and various other Echinoderms." Is not this a Warminster fauna, and is it not in the "local top of the Upper Greensand," whatever the bed might formerly have been called?

Having now replied to Mr. Meÿer's queries, I should like to ask him two questions in return. (1). Why has he changed his mind regarding bed 13, and why does he not identify it with the zone of *Belemnites plenus*? (2). What does he mean in saying that he was therefore wrong in giving *Holaster subglobosus* so wide a range in his tables of fossils? Is it not found in the beds where he marks it as occurring?

Finally, I may express my satisfaction at finding that Mr. Meÿer admits "that the term Chloritic Marl is and always has been a bad one," and I hope he will ultimately agree with Mr. Whitaker and myself in advocating the entire abandonment of the name.

Dec. 16th, 1878.

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