

think that its correlative *overstep* will be likely to meet with favour, and its adoption would certainly emphasize the distinction to which Mr. Goodchild has called attention.

It must be remembered, however, that both cases involve an unconformity, and that the difference between them is really this: in overlap the basement member of the upper series has a limited extension, while in *overstep* the basement bed has a continuous extension. It is also worthy of remark that the unconformity between the two series will generally be much greater in the case of overlap than in the case of *overstep*, for in the latter the beds all dip in the same direction, and the existence of an unconformity is usually only made patent by the fact of *overstep*. The real want of the term *overstep* is not in fact brought out by the diagram drawn by Mr. Goodchild, since the unconformity there shown is so marked that the relation of the upper series to any single member of the lower series is not likely to be made a matter of discussion. It is only where both series dip evenly in the same direction that a term is required to express the relation of the upper to the members of the lower series.

May 18th, 1883.

A. J. JUKES BROWNE.

CHALK-MASSSES IN THE CROMER DRIFT.

SIR,—Mr. T. M. Reade is mistaken in supposing that I am alone in regarding all the larger masses in the "Cromer Drift" as reconstructed Chalk. In reference to this, and to his enquiry whether the Old Hythe pinnacle of Chalk figured by Sir Charles Lyell was of this reconstructed character, I refer him (and others) to page 150 of the *Geological Magazine* for 1864, where, in a footnote, Prof. H. G. Seeley observes as follows:—"The figures given in Sir C. Lyell's Elements, p. 129, are not included pinnacles of Chalk, but only reconstructed chalky drift full of all sorts of rocks."

It was the perusal of this note which first called my attention to the subject, and Mr. Harmer and I found Mr. Seeley's statement as to the masses being of reconstructed material correct, examining as we did the numerous masses worked for marl-pits and lime-kilns over the country inland occupied by the Contorted Drift, though in most of them fragments of material foreign to the Chalk, save galls of sand and clay, and were not common. The *sheets interstratified* in the lower part of the Cromer cliff section, such as that near 150 yards long at Runton (where this part, heretofore called the Till, is represented in Mr. C. Reid's memoir as the "Contorted Drift"), are of Chalk *not* reconstructed, and were brought from Chalk shores, and dropped on the bottom, as I have pointed out; and, as the submergence had then only begun, may very likely have come from some part of Norfolk, but when the masses of reconstructed Chalk were brought, and sunk deep into the substance of the sea-bed, the *whole of this county* was submerged, the highest points in it being formed of this sea-bed. For many years before Mr. T. M. Reade's paper on this subject, I have repeatedly referred the transport and introduction of these masses to floating ice grounding on the sea-

bottom, as he does, but neither in respect to them, or to very much more of the facts connected with the North Norfolk Cliff (inclusive of the *true* Forest-bed), can I admit Mr. C. Reid's memoir to be any authority whatever, regarding it, as I do, as greatly at variance with the real state of the case.

As to tracing the masses in the Contorted Drift in a train up to Lincolnshire, which Mr. Reade challenges me to do, the formation containing them has been destroyed over West and North-west Norfolk, and over the area between there and the Lincolnshire Wold, by the subsequent advance of the Land-ice giving rise to the Chalky clay, as delineated in the maps to my late memoir on the Newer Pliocene period in England, but as far as the Contorted Drift can be distinguished in that direction they occur.

June 16th, 1883.

SEARLES V. WOOD.

WEST GALWAY ROCKS.

SIR,—These rocks are referred to at page 657 of the "Text Book of Geology," by Dr. A. Geikie, and it is stated that my classification suggests that the Upper Cambrians pass unconformably into the Llandeilo formation without the occurrence of the thick Arenig rocks of Wales. I presume that my opinions have not been made sufficiently plain, as this eminent geologist has evidently misunderstood my writings on the subject. In the "Geology of Ireland" the classification of Lyell, and which also appeared to be the opinion of Sir A. C. Ramsay, was followed,—the representatives of the Arenig rocks of Wales being included in the Cambrian group, among the Upper Cambrians. But as some of my reviewers suggested that I had ignored the Arenig series, in subsequent writings more details were entered into; as, for instance, in the papers on *Irish Palæozoic Rocks*, Manchester Geol. Soc. April, 1879; *Supposed Upper Cambrian Rocks, Counties Tyrone and Mayo*, Royal Irish Academy, December, 1879; *On the Thickness of the Irish Bedded Rocks*, Royal Dublin Society and Royal Geol. Soc. Ireland, November, 1880, etc., etc. In these and other papers published about that time, the supposed equivalents of the Welsh Arenig rocks are specially mentioned, and the reasons given for supposing them to be equivalents.

How the rocks in the south portion of West Galway can be older than those in the north portion, it is hard to conceive when we know that the former are in part made up of fragments of the latter; that is, the rocks which are said to be oldest are made up of the *débris* of the younger rocks. Furthermore, on account of the remarkable similarity in the rocks and groups of strata that margin on the north-east and south, the rocks of the Bennabeola group of hills, also for other cognizable reasons, I am compelled to believe with Griffith and all the geologists who have examined the country that the rocks of the Bennabeola group of hills must be older than those in the country to the south-east and north of them.

In this south-west Connaught tract of Metamorphic rocks, which includes portions of N.W. Galway and S.W. Mayo, there were two