

was demanded to account for phenomena which “have for many years attracted the attention of geologists” and now, even of the above-named authors themselves, albeit if with the knowledge then (1882) available an exact explanation was not possible.

Nor can it be said that Professor Bonney and Mr. Hill by their communication have advanced matters much, for unfortunately they appear to have left out of sight two rather important items, viz., the fossil contents of the beds and the literature on the subject since 1882.

Long familiarity with rocks which can only be studied stratigraphically and by aid of the microscope and field-glass may, perhaps, have led them to overlook the palæontological aspect of the Trimmingham chalk masses. Professor Bonney, it is true, noticed the conspicuous Belemnite occurring throughout, but is not aware that it is of less importance as a zonal guide than the concomitant *Ostrea*, which does not occur throughout.

To thoroughly investigate the fossil fauna of a bed in cases such as the present one is not possible, however, to the casual visitant: it can only be done with long and patient research by one on the spot.

Fortunately the Trimmingham chalk masses have had their historian in Mr. R. M. Brydone, who, with a care and patience that cannot be too highly commended, made a thorough examination of them, collected and worked out their fossils, and in 1900 published a pamphlet entitled “The Stratigraphy and Fauna of the Trimmingham Chalk.” In this he showed that the uppermost portions of the masses are the sole remaining vestiges in England of the Maestrichtian beds of the Chalk. He further discussed Mr. Clement Reid’s theory, which in the light of these later researches he showed to be untenable and suggested that these masses were really buried sea-stacks. This view is supported by the Mundesley boring. Whether these pinnacles have remained upright, or have been crushed, crumpled, and overturned, is of little moment, but it is important to note that the strata in them are of the same age as the beds capping the *mucronata* chalk, that are exposed in the beach at extreme low water.

That these masses are part and parcel of the main Chalk strata that lie at no great depth under the beach at this spot, I was enabled to see in the Autumn of 1901 after a storm that had cleared away the beach for some distance round their base. The bands of flint were distinctly traceable down into and right across the exposed surface. The sketch and notes I made at the time were passed on to Dr. Rowe and Mr. Sherborn against the time when they come to deal with the Norfolk district.

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[We have received several other letters on this subject, all embodying the same points of criticism.—EDIT. GEOL. MAG.]

THE RAISED BEACHES OF DEVONSHIRE AND OF THE SOUTH OF IRELAND.

SIR,—I much regret to find that I have both misunderstood and misinterpreted Mr. Muff’s ice-scored beach-platform in the South of Ireland.

Ever since Godwin-Austen in 1851 attacked the problem of the

Head, Aerial beds, or Rubble-drift, of the south-west of England, geologists have entertained the idea that both the beach-platforms and the beach-deposits may have been influenced by coast ice.

When Messrs. Wright and Muff recorded the fact that a beach-platform in Ireland was scored by ice, nearly parallel with the shore, it never occurred to me that the agent could have been any other than the coast ice so long postulated by the students of raised beaches. Further, I accepted what I supposed to be Mr. Muff's proofs, in spite of my previous contention that the South Devon beach-platforms were not due to coast ice. My paper on the Raised Beaches of Torbay (Trans. Dev. Assoc., 1903) was written to contest Mr. Pidgeon's conclusions as to the Torbay beaches being accumulated under semi-Arctic conditions, and their shells broken by ice.

Ever since Mr. Muff's paper appeared, I have been trying to reconcile his supposed (by myself) glacial ice-scratched platform with the Devonshire evidence, that is to say, a platform contemporaneous with the ice-scourings. I have found it difficult. I am profoundly grateful to Mr. Muff for his prompt and public correction of my mistake.

With regard to the Devonshire erratics, I may say that on the 17th of August last I spent four hours on the Prawle coast, before and after the lowest tide for that full moon. The two crystalline blocks recorded by Pengelly some thirty years ago as on the strand, have been since described as on the beach-platform. They lie just beyond the reach of ordinary spring tides in calm weather, and are certainly on the present tidal strand. When Pengelly described them, the only known explanations of their presence were: wreck, or ice. They are far too heavy and unmanageable for use as ballast, so the only explanation was ice. It was not then known that fishermen often trawl blocks of the size of those referred to, and bring them away from the fishing-grounds. Now, were a fishing-smack, carrying two blocks, to be cast away on the Prawle coast in a S.S.E. gale at the top of high-water spring tides, she might just possibly reach the spot where the two Prawle blocks lie close together. Taking all the facts into consideration, this explanation seems to be the least improbable of the three, viz., ice, ordinary wreck, or trawler wreck.

The ten-ton boulder at Baggy Point in North Devon is obviously nothing but an ice-borne erratic, and the puzzle is that it is apparently associated with such a decidedly southern shell as *Cardium papillosum*. Then at Fistril Bay, in a beach presumably contemporaneous with the Baggy Point Raised Beach, we have *Cytherea chione* recorded; and in Torbay *Fusus Jeffreysianus*, associated with *Trophon truncatus*. It is this association of shells having a northern range with others with a southern range, and the association of a still more decided southern shell with an ice-borne erratic, which is so perplexing.

I do not propose to trespass on your space with any speculations on the subject. So far as Devonshire is concerned, the problem of the beaches may be treated as a strictly local one, and as such better discussed in provincial publications.

A. R. HUNT.

FOXWORTHY, MORETONHAMPSTEAD.

9th September, 1905.