

PRE-BELEMNITELLA MUCRONATA WHITE LIMESTONE
IN NORTH-EASTERN ANTRIM

SIR,—In Fraser Hume's account (1897) of the Cretaceous rocks of Co. Antrim, no zone below that of *Belemnitella mucronata* was recognized in the typical White Limestone of his eastern division of the area, where the underlying Sponge Beds were referred to a Zone of *Marsupites* or *Actinocamax verus* (ibid., Table 1, p. 568). This general picture was assumed to be correct in my paper on the sponges (Reid, 1958). In fact, the first large belemnites are *Goniot euthis*, not *Belemnitella*, in a series of localities extending across this division, and into the area of the Highland Border Ridge (the north-eastern end of Hume's Peninsula) further north. In addition, White Limestone as low as the Zone of *Marsupites testudinarius* can be shown or inferred in several places.

White Limestone lower than the *B. mucronata* Zone was first found here by Dr. J. M. Hancock (1961, p. 28) at the Magheramorne cement works, south of Larne, where the lowest 6 feet belong to the Zone of *G. quadrata*. The Sponge beds are missing in this section, but *Goniot euthis* occurs in White Limestone succeeding them at localities extending from the southern end of Islandmagee (Cloughfin Port) to three and a half miles north-west of Larne (foreshore and quarry exposures north and south of Ballygalley Head). The genus is common and easily recognized in this area, though examples are difficult to extract or identify specifically. In the south, the base is probably well below the Zone of *G. quadrata*. This is seen best in a large slipped mass at Hillspoor, Islandmagee, where *Goniot euthis* occurs from ca. 5 feet to at least 21 feet above the green nodules at the top of the Sponge Beds, and *Actinocamax verus* ranges up from the Sponge Beds through about the first 10 feet; the latter form does not range above the Zone of *M. testudinarius* in other Irish localities where that zone is known to occur (Whitepark Bay, Red Bay-Garron Point), and bodies which seem to be smooth *Marsupites* plates can be found at ca. 8 to 10 feet from the bottom. The apparent absence of *Goniot euthis* from the lowest 5 feet suggests the Zone of *Uintacrinus westfalicus*, within which this genus appears at Whitepark Bay. Further north, however, the base seems to rise, since *Goniot euthis* is seen within inches of the Sponge Beds at Portmuck and on the Waterloo foreshore north of Larne.

The next coastal occurrences of *Goniot euthis* in White Limestone are seen in slipped material on the hillside and foreshore in the area beginning about two miles south-east of Glenarm. Most of the blocks are of typical flinty facies, but some show up to 6 feet of hard gritty flaky-weathering flintless chalk; I have not seen this *in situ*, but suspect its correspondence with that seen below the flinty *Marsupites* chalk of Garron Point. *Goniot euthis* can also be found at road level in the roadside cliff section about half a mile outside Glenarm, where *G. granulata* is common and presumably marks the Zone of *Offaster pilula*.

North of Glenarm the Sponge Beds and underlying Glauconitic Sandstone are replaced by the conglomerates of the Highland Border Ridge zone, though still present in the landslip area just cited. In the Garron Point area (Reid, 1962) conglomerate with a matrix of glauconitic chalk is succeeded by rock showing upward passage from glauconitic chalk to White Limestone. Incipient flints appear 2 feet above the conglomerate, and typical flints at ca. 7 feet. *Marsupites* plates have been found in the lowest foot with fully formed flints, and possible *Uintacrinus* plates occur in the passage bed. *Goniot euthis* appears ca. 3 ft. 6 in. above the conglomerate, and is present in at least 15 feet of flinty White Limestone. Various parts of this succession can be seen in slipped blocks at the Point itself, including the "White Woman" raised stack, and just west of the quay about one and a half miles to the north-west.

It will be seen that pre-*B. mucronata* White Limestone is widely distributed along the east Antrim coast. The zones identified or inferred may even extend through the whole of the area, except for a gap at Magheramorne; the notion (Hume, 1897) that no "Zone of *Belemnitella quadrata*" (i.e. Zones of *G. quadrata* and *O. pilula*) can be recognized in the area is clearly mistaken.

A question which arises from the presence of chalk with *Marsupites* on both sides of the Highland Border "peninsula" is whether White Limestone of *M. testudinarius* age was deposited continuously across the area between Garron Point and the Whitepark Bay exposures of the north-western side, which were formerly the only ones known (*cf.* Hume, 1897; Hancock, 1961) in Ireland. The evidence is against this possibility, but deposition seems to have extended across the north-eastern end of the "peninsula". At Capecastle, two thirds of the way to Whitepark Bay from Garron Point in a straight line, *Goniot euthis* occurs in a nodular glauconitic chalk underlying the White Limestone, an example identified half-way up by Dr. Hancock being *G. granulata* (1961, p. 29). Near Retreat Castle, only five miles west of the Garron Point quay locality, the base is even higher; conglomerate truncated by an erosion plane is followed directly by flinty White Limestone with *B. mucronata* less than three feet from the bottom, and *Goniot euthis* seems absent. But at Murlough Bay most of the belemnites in an outwardly similar section are *Goniot euthis*, though *Belemnitella* occurs in the highest chalk exposed. This precipitous section is difficult to study, but yields *Actinocamax* only near the base, and *G. granulata* as much as 30 feet higher. The base is thus probably at least in the Zone of *M. testudinarius*, and possibly lower, though certain examples of this crinoid have yet to be found. Regarding the evidently higher base level elsewhere, intra-formational removal of formerly extensive low White Limestone is unlikely, in view of the absence of flints as constituents of any Cretaceous conglomerate known in this area.

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