

The Gopeng Beds, consisting of clays and boulder-clays with some stratified drift, are of glacial origin. This is proved by the inclusion of large boulders in the clay, by the physical condition of the components of the clays and their distribution, and by the striking resemblance of the beds as a whole to Pleistocene glacial detritus.

The nature of the beds is considered to be sufficient proof of glacial origin, but it is admitted that no boulders have been found showing striation due to ice-action, nor has any glaciated rock-surface been found. Such evidence, however, can hardly be expected, because the boulders are all more or less decomposed owing to the great power of the ground-water in removing silica; and, if the limestone ever presented the features of a glaciated surface, it has been so much modified by solution owing to the action of ground-water since then, that all traces of those features must have disappeared. Large unweathered boulders of corundum are present in some of the beds, but their hardness would make the appearance of ice-scratches improbable.

Unfortunately the pale and uniform colouring of the bulk of the clays and boulder-clays makes it hard to obtain photographs showing clearly the resemblance to Pleistocene glacial deposits. A number of photographs is submitted, however, that will, it is hoped, do something towards this. The petrology of the Gopeng Beds is described in detail. The most interesting point revealed is that the ice from which the detritus was derived passed over a stanniferous granite mass, and in consequence the Gopeng Beds carry tin-ore throughout, though sometimes in very small quantities. This tin-ore is an original constituent of the beds, but they have been further enriched by tin-ore derived from the Mesozoic granite at their junction with the granite and in the neighbourhood of veins from the granite that have risen through the limestone.

The faulting in the Gopeng neighbourhood, the general structure of the country, and the age and origin of the Gopeng Beds are discussed in detail. The Gopeng Beds are considered to be the equivalent in time of the Talchir boulder-beds of Orissa; but a petrological similarity is wanting, because the Gopeng Beds were derived from a mass of stanniferous granite, the position of which is at present unknown.

CORRESPONDENCE.

THE CULM-MEASURES OF THE EXETER DISTRICT.

SIR,—In the last number of the *GEOLOGICAL MAGAZINE*, pp. 495–7, Mr. Arber, when criticizing Mr. F. G. Collins for doing things he has not done, and for omitting others that he has done, has allowed himself to commit a double error.

It is clear from a glance at Mr. Collins's paper¹ that the words Mr. Arber quotes, and to which he objects, are not those of Mr. Collins at all; they relate solely to the fauna which Mr. Crick

¹ Quart. Journ. Geol. Soc., vol. lxxvii, pt. iii, p. 393, 1911.

has so admirably worked out and described in his notes (loc. cit., pp. 399–413).

Mr. Collins has made a good beginning by finding a useful fauna in a difficult area; and by carefully recording the location of the specimens he has laid the foundations of a more detailed knowledge of these rocks in the only possible way. He wisely commits himself to no conclusions at present. When he has done more work on the same lines, with the assistance of his palæontological friends, he may be able to throw some light on the detailed stratigraphy of the area; even if he does not, he will at least have given us something firmer to build upon than those lithological resemblances on which Mr. Arber has to place so much reliance.

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THE ZONAL CLASSIFICATION OF THE TRIMINGHAM CHALK.

SIR,—In his Presidential address this year to the Malacological Society Mr. R. B. Newton quoted my statement in 1908 that “hence the zone of Chalk at Trimmingham, lying above the zone of *Belemnitella mucronata*, now divided and defined by me for the first time, requires a name”, and inferred from those words that I had forgotten my own proposal in 1906 to establish a zone of *Terebratulina gracilis* and *T. Gisei* for this Chalk. This is a misconstruction, but one to which I have laid myself fairly open by excessive brevity. The facts are that in the original paper of 1908 I stated that my opinion was unaltered (it still is unaltered) that *T. gracilis* and *T. Gisei* were far superior to any other fossil or assemblage of fossils both for defining the zone and for labelling it. My editor said, “You had better leave that out: they will never adopt it,” and the statement quoted by Mr. Newton was settled to take its place. It was intended to bear the construction that two opposite views as to the best definition and label of a zone embracing the Chalk of Trimmingham being on record, with a detailed account of the palæontology of the numerous divisions of that Chalk, the question is ripe for the final tribunal on such questions, i.e. the consensus of textbook-writers, to which it must be left. It does not follow that either view will succeed.

R. M. BRYDONE.

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OBITUARY.

DEATHS are announced, on September 25 of Auguste Michel-Lévy, Director of the Geological Survey of France; on August 6 of Dr. Florentino Ameghino, Director of the Museum at Buenos Aires; and on June 5 of Dr. Victor Carl Uhlig, Professor of Geology in the University of Vienna. Suitable Notices will appear later on.
