

CORRESPONDENCE.

CHALK AT TRIMINGHAM.

SIR,—A chance meeting on Trimmingham beach in July brought me the acquaintance of Mr. J. E. Sainty, and also news from him of a new exposure of Chalk at the foot of the cliff just in the parish of Siderstrand and about a quarter of a mile south-east of the Overstrand Hotel. This exposure when I saw it consisted of a very flat arch (about 100 feet long and 7 feet high above the beach) of sponge bed about 6 inches thick, resting on very soft white Chalk with many large flints. I found the usual fossils of the Beeston to Cromer foreshore Chalk, and none to suggest any higher horizon. The sponge bed was the hardest and most uniform, and the very abundant sponge casts the sharpest I have seen in the *Belemnitella mucronata* Chalk of Norfolk; and the flints were as carious as those of the *Micraster cor-testudinarium* Chalk of Sussex. In the middle of the arch the sponge bed could be seen to slope upwards into the cliff at a low angle for about 10 feet to the foot of a straight face of Crag some 12 feet high, with a strongly marked band of shells running through it. It was not possible to say whether the Chalk was *in situ* or an erratic; but I strongly expect to find it an erratic.

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THE DEFINITION OF AUGITE-BIOTITE-DIORITE.

SIR,—“Unless we shall first establish what is a modius and what is a balance, how shall we be able to measure or weigh anything?” These words of Epictetus came to my mind when I read Miss Reynolds’ reply to Professor Bailey in the August number of *GEOL. MAG.* Professor Bailey appears to have confused a rock that Miss Reynolds calls augite-biotite-diorite with gabbrodiorite. In her reply Miss Reynolds says:—

“The typical augite-biotite-diorite is a highly undersaturated rock. It might equally well be described as biotite-essexite-gabbro. These rocks should not be confused with gabbrodiorite.”

To a student of rock names these statements are very disconcerting. A diorite which might equally well be described as an essexite-gabbro! A rock which contains modal quartz and is yet “highly undersaturated”! Miss Reynolds refers us to Tröger’s *Kompendium*, p. 146. Following up this reference, I find that the characteristics of the gabbrodiorite family are the presence of a plagioclase near An_{50} in composition; more than 10 per cent

of dark minerals; quartz and feldspathoids either absent or present in small quantity. The mode chosen to represent the species contains 6 per cent of quartz and orthoclase, 53 per cent of plagioclase (An_{50}), and 41 per cent of pyroxene, biotite, and accessories. Tröger also defines essexite-gabbro as a "plagioclase-rich, feldspathoid-poor essexite with $An > 50$ ", and gives the following mode: plagioclase (An_{52}) 31 per cent, alkali-feldspar 17 per cent, augite, olivine, and accessories 48 per cent.

Turning now to Miss Reynolds' 1934 paper, p. 611, I find that the augite-biotite-diorite of Slievegarron contains 45 per cent of plagioclase (An_{35}), 49 per cent of augite, hornblende, and biotite, and the usual accessories. "A trace of orthoclase and quartz" is included in the figure for plagioclase. Comparing this mode with those quoted above, I must agree with Professor Bailey that gabbrodiorite is the most appropriate name for the rock. It is not an undersaturated rock in the sense in which I and others have used that term for the last twenty years. The fictitious appearance of olivine and nepheline in the norm has nothing to do with the case, because all current definitions are based on modes, not on norms. The difference between norm and mode in this case results from the unusually high proportion of biotite in the rock. Miss Reynolds claims that the "petrological affinities" are very different from those of gabbrodiorite. This argument leaves me cold. It has been my experience that when a petrologist begins to talk about petrological affinities he is generally begging the question.

I think Miss Reynolds owes it to her readers either to conform to accepted definitions of names and terms, or else to explain clearly what meanings she herself attaches to them.

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