

rough calculations take the alumina as 14 per cent., and use the proportions given by Nicol in his *Mineralogy*: then there will be in anorthite $\frac{4}{7} \times 14$ of silica, and $\frac{2}{7} \times 14$ of lime, i. e. the amounts of silica and of lime in the felspar will be nearly 16.3 and 7.6 respectively. But the amount of CaO in the analyses is only 3.05 or 3.22. Moreover, the total of the constituents in the anorthite would be nearly 37; or more than a third of the rock would be felspar, which is certainly far too much for any slide that I have seen. If the amount be calculated from the lime, 5.5 of the alumina would be needed, and 6.5 of the silica, and the felspar would be 26 per cent. of the rock,—still too much, and there would be 8.5 of the alumina left. In both these cases also there is not magnesia enough for the remaining silica, if, as seems certain, another principal constituent has been olivine. Suppose, however, the felspar be labradorite; then, calculating in the same way, and supposing all the lime to be a constituent of that mineral, we require 8 per cent. of the alumina, leaving 6 per cent., so that the rock should be rather rich in such a mineral as spinel, which it is not. In this case also the proportionate amount of felspar seems considerably in excess of the amount of the mineral which has been claimed. I have made various other trial calculations from the analysis, and in no case can I obtain results which seem to accord with the microscopic structure of the rock, even in matters on which I believe we should be in agreement.

I may indeed add that I have more than once found a similar apparent discrepancy between the microscopic and the chemical analysis of a picrite, and had reason to suspect that the alumina was mainly present as the constituent of a mineral other than felspar. So, notwithstanding the apparently conclusive evidence of the chemical analysis, on which I frankly admit Mr. Teall is entitled to claim a verdict in his favour, I still feel very strongly the difficulties as to the identification of the mineral alleged in my former communication, and am not sure that the question is even yet decided beyond all appeal.

T. G. BONNEY.

THE BAGSHOT SANDS.

SIR,—I do not think Mr. R. S. Herries (*GEOL. MAG.* April, 1887, p. 192) has found such a 'mare's nest' as he seems to imagine. The note he has quoted from vol. iv. of the *Memoirs of the Geological Survey*, of a pebble-bed somewhere near Barkham, has long been familiar to me; but I have never succeeded in finding *the* pit to which the description would apply. Short of the identification of the pit, which I have described in my paper in the *GEOL. MAG.* for March last, by the original writer of the note quoted, I cannot admit its application to the case in question. If the author of that note is prepared to vouch for the supposed identification, the inaccuracy of the description will go far to vitiate the evidence of similar notes from the same source. I leave my critics to choose between the horns of this dilemma.

In speaking of an "unmapped outlier," it was simply intended to imply that the beds under consideration *had not been mapped out*

as an outlier. A portion of them had been mapped, as I knew perfectly well; but, as I think, wrongly. As a matter of fact, they are found to extend half a mile further to the north, than the boundary-line drawn on the map. When Mr. Herries shall have made as complete and close an examination of the locality as I have made, I shall be glad to welcome further criticisms from him on my paper; meanwhile I do not feel quite justified in filling up the pages of the GEOLOGICAL MAGAZINE in recording "glimpses of the obvious."

A. IRVING.

WELLINGTON COLLEGE, BERKS.

OBITUARY.

ARTHUR CHAMPERNOWNE, M.A., J.P., F.G.S.

BORN MARCH 19TH, 1839; DIED MAY 22ND,¹ 1887.

EVER and anon as we press forward in life's journey we are confronted with the loss of some valued friend and comrade, in whose removal we seem to suffer a far greater hardship than any other we have had to bear. To many of us such a feeling arises when we recall the keen sorrow of a few weeks since at the loss of our fellow-worker in geology, Arthur Champernowne.

He was the eldest son of Henry Champernowne, Esq., of Dartington Hall, Totnes, South Devon, and belonged to one of the oldest families in Devonshire. His father died in 1851, whilst Arthur was only 12 years of age. He was educated at Eton, whence he passed to Trinity College, Oxford, where he graduated as M.A. In 1870 he married Helen, daughter of M. L. Melville, Esq., of Hartfield Grove, Sussex.

Soon after he settled down in Devonshire, he became acquainted with William Pengelly, F.R.S., of Lamorna, and John Edward Lee, F.G.S., of Villa Syracuse, Torquay, the latter of whom was the intimate friend of Prof. John Phillips, of Oxford, whose lectures Arthur Champernowne had attended. The interest these geologists aroused in his mind caused him to look around his own county and try to understand, and finally to map, probably one of the most complex pieces of country in the whole of England.

Mr. Champernowne never enjoyed robust health, but his earnestness and enthusiasm in whatever he undertook carried him through successfully. He was an excellent artist, and when travelling for his health in Italy, he made many sketches; but after he took up geology he only used his pencil to prepare sections and draw fossils, which he executed with great skill and fidelity.

He geologised in Spain, and in order the better to comprehend his native county, he made repeated expeditions to the Devonian rocks of the Eifel, on one occasion with Mr. John Edward Lee, of Torquay,

¹ The 5th June was by an error the date quoted in the July Number *Geol. Mag.*—EDIT.