CORRESPONDENCE.

GEOLOGY OF THE NINGI HILLS.

SIR,—I hasten to express my regret that I did not mention the fact that in 1911 Dr. Falconer mapped the Ningi–Kila–Fagam granites. I am afraid that I am so familiar with and indebted to "The Geology and Geography of Northern Nigeria" that I forgot that others might not be equally acquainted with it.

I do not understand what is meant by "local controversies". So far as I know Dr. Falconer is the only geologist who has written anything on the geology of this area, and also I do not see how these preliminary notes, based on a prospector's notebook, can be regarded as controversial. It would have been better, I admit, to have retained Dr. Falconer's non-committal nomenclature of the "younger granites", at any rate pending further research.

It is, however, difficult to follow the rest of the letter. In the map that accompanies Dr. Falconer's book the area covered by my traverse is, with the exception of the Ningi, Kila, and Fagam Hills, entirely mapped as ancient crystalline rock, as part of the great mass of archæan rocks that form the basal plain of Northern Nigeria. I have not the book by me at present, as I am on trek, but I am almost certain that, as shown on the map, Dr. Falconer's itinerary passed up from Sabon Garri, through Tipchi, and thence to the Ningi Hills. It passes therefore over the area I mapped as Sabon Garri granites, and along the same rocks in the shadow of the great mass of Duchin Chanya Cherigi.

It was on this authority that I classed these granites as archæan, for in all respects they correspond with the archæan granites described in the book, notably in that they show ill-defined margins with the gneisses and never, like the "younger granites", show any contact alterations. If, then, my Sabon Garri granites are merely "a number of outcrops of younger riebeckite granite projecting through older micaceous gneisses of various types", they should, according to Dr. Falconer, be accompanied by well-defined contact alterations. But there is no sign of such alteration, and though Nos. 100 and 105 were taken close to the edge of the mass and near to the schists and gneisses, they show no sign of marginal cooling. No one looking at these rocks and those of the Ningi granite could fail to note the marked difference in structure.

Moreover, these Sabon Garri granites may be traced across the Minna River and up to Ningi. Two miles north of that village there is an excellent contact between the Sabon Garri and the Ningi granite. The latter displays chilled margins and the usual contact phenomena.

I fear that the "capable observers who repeatedly traversed"

this area were ignorant of Dr. Falconer's own definitions of the two types of granite.

Finally, as the district was traversed in 1911, why are not these Sabon Garri granites mapped as " projections of younger granite " ? They cover a larger area than the Kila granites, which are correctly mapped ! Can it be that since Dr. Falconer adopted the theory (*vide* last paragraph in his letter) that tin occurs only in the younger granites, and since the presence of tin *in situ* in the Sabon Garri granites is unquestioned, he has rechristened these rocks to suit the theory ?

It is easy to say in what rocks a given mineral does occur, but he would be a foolish man who asserts in what rocks it will not occur. Mineral occurrences are not confined to one age, and Murchison's classic error in regard to the occurrence of gold should not be forgotten. This is a matter of considerable importance. If tin is found only in the " younger granites ", then it would be idle to look for it in any of the other rocks, so that, *vide* Dr. Falconer's map, only a very small area offers any prospects for the miner.

When I found tin occurring in granites which agreed with Dr. Falconer's description of the archæan granites associated with the gneisses (and mapped as such by him), I traced one series of these rocks and differentiated them from the normal non-stanniferous type under the name of the Sabon Garri granite.

Believing in the importance of this observation I published it, hoping that other mining men would come forward and describe the country with which they were familiar. By so doing the slight knowledge we have of the stanniferous granites would be widened. Nigeria is a large country, and vastly important as Dr. Falconer's work has been, it is only an outline of the geology of the Protectorate. The details, if they are to be filled in, must be done by the men on the spot who bring forward their notebooks and samples. The mining man is usually fitted to do this work. As a class unacademic in training or thought we make academic errors unconsciously. Witness the premature description of the " younger " granites as Mesozoic in my own " Notes ". But on the whole the mining engineer who has preserved his interest in geology makes a good " unskilled labourer " in the field of geology, capable of recording observations and bringing home samples for the benefit of those whose knowledge is infinitely greater but whose opportunities of travel are vastly less. It is in that capacity that I regard my own work, a record of things seen, but not in any way an attempt to raise controversies.

I am sure that the Curator of the Sedgwick Museum would gladly give Dr. Falconer access to any of the slides or specimens so that he may see for himself the types of rock described, especially Nos. 100 and 105.

GERARD W. WILLIAMS.

P.O. Jos.
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