

States, tourmaline is found more or less completely altered to a mica (probably phlogopite) and limonite, the degree of alteration decreasing with increasing depth from the surface, suggesting that the change was caused by the percolation of water from above. The freshness of tourmaline grains in sands is very probably due to the removal of the altered products by chemical and mechanical means.

III.—GEOLOGICAL SOCIETY OF GLASGOW.

VOLCANOES IN AYRSHIRE.—At a meeting of the Geological Society of Glasgow, held on March 9, Mr. G. V. Wilson, H.M. Geological Survey, read “Preliminary Notes on the Volcanic Necks of North-West Ayrshire”. The area dealt with lies between Dalry, Ardrossan, and Largs, and has been found to contain the remnants of about thirty volcanoes. The various necks were described, and it was pointed out that they were not all of the same age. While some are probably of Calciferous Sandstone age and connected with the great Misty Law volcano further north, others were much later as they contained large blocks of sedimentary rocks, including one with a coal-seam which was large enough to be worked within the vent many years ago. This vent must therefore have been in action after the formation of the coals of early Carboniferous times. Fragments of charred wood also occurred, while in one instance sea-shells, which had evidently been washed from the sea-floor directly into the volcano, were found. This showed that the volcano had been either submarine or on low ground liable to submergence, and the shells being of a type not later than Millstone Grit, the age of the vent was approximately fixed thereby. It was pointed out that the ash in the necks was, in some instances, very similar to that which replaces the black-band ironstone over much of the Dalry district, which suggested that it had come from this source, and that activity had continued intermittently until Millstone Grit or later times. It was suggested that in the days of its activity this district had resembled the San Franciscan volcanic field of Arizona. The paper was illustrated by a series of photomicrographs and views.

Mr. J. V. Harrison, B.Sc., described a section at Tormore, Arran, showing the junction of the two red rock series of Arran, and where no sharp line of division was visible.

CORRESPONDENCE.

THE GRAINSGILL GREISEN OF CARROCK FELL.

SIR,—Among a collection sent to me last year of small specimens from various well-known rocks in the British Isles was one of the Grainsgill Greisen, Carrock Fell, described in vol. li of the Q.J.G.S. by Mr. A. Harker. For purposes of comparison with local rocks I have had three sections prepared from this specimen, which was only about $1\frac{1}{2}$ in. square and $\frac{1}{2}$ in. thick, and used the remainder for separations in heavy liquids. The quantity of rock available was so

small that it is impossible to base any conclusions on the examination, but the following notes may be of interest to anyone who has time and opportunity to examine larger specimens.

The most interesting point observed in my specimen is the abundance of rutile, in the form of "sagenite webs", in the mica. A separation of powdered rock in a liquid of 2.8 sp.g. afforded a lot of them. They are visible in the slides too, but their abundance is only appreciated in preparations where the mica flakes are lying flat. In addition to rutile I obtained a few grains of brookite and one crystal that resembles anatase. One little plate of brookite, with clear crystal outline, gave a good axial figure. This unfortunately was either lost or turned on edge when mounting the heavy minerals in balsam, but two other minute grains give figures with a $1\frac{1}{2}$ in. oil immersion objective.

With regard to the origin of the small-flaked mica I am inclined to think it is certainly derived from the felspar, of which I was able to separate enough for two microscope preparations, and there is evidence too of some of the large-flaked mica being derived from felspar. With regard to that containing the sagenite webs, the latter are unusual in muscovite, in fact I do not remember ever seeing them, and their presence suggests that the mica may originally have been a dark mica which has become bleached, but not completely so. On the other hand, it might be argued against this that the mica containing the webs has an axial angle about equivalent to that of muscovite, but the idea that the rock originally contained a dark mica is strengthened by the fact that some of the quartz-grains enclose minute flakes of biotite.

Apatite and zircon occur, and I found a few minute grains of a mineral like cassiterite. One showed a carmine pleochroism common in cassiterite, although not mentioned in textbooks. I was unable to prove anything, however, about these grains. Some may be sphene.

I found two grains of tourmaline, and tested the mica for lithia with negative result.

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MISCELLANEOUS.

THE ZOOLOGICAL RECORD FOR 1914.

This work has made its appearance a little later than usual owing to the difficulty in getting some of the literature. The volume for 1915 is well in hand, and it is hoped will be ready by next Christmas. At present it is the only work of reference from which one can gather the palæontological results of the year. The part containing any special group of animals can be had separately from the publishers, the Zoological Society of London.
