XII. *On the Tremolite of Cornwall.*

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I do not know whether some observations upon a fossil of the Tremolite species, which I discovered some time since in the county of Cornwall, may be worthy the attention of the Geological Society. I was induced to record them for the following reasons. I was not aware that tremolite had ever been noticed before in our western counties. The existence of it in the particular rock which I should conceive would be classed amongst the serpentines, is not, as I am informed, an usual occurrence: and above all, I wish to draw the attention of experienced and scientific geologists to the district where this fossil was found.

I met with it nearly on the summit of a hill, in a rock which breaks forth in masses forming an irregular and picturesque ridge called Clicker-tor. It is situated about three miles from the town of Liskeard, very near to the great road which leads to Plymouth. This ridge of rock is at a considerable elevation extending in a direction from east to west, and (if I may venture to judge by the eye) for upwards of a quarter of a mile in length. It forms a very

striking feature in the neighbouring country. Blocks of the same species of rock are scattered about in different parts of the hill and in its vicinity.

This rock is of dark bottle green colour. All the specimens of it do not possess an uniform degree of hardness: they vary also in respect of fracture. The harder species frequently assumes that wavy and polished exterior surface which characterizes the magnesian stones. It is sufficiently hard to scratch glass. It has an uneven and sharp edged or splintery fracture, which exhibits no lustre. Upon examination of its surface with a pocket microscope, it appears to consist of a very fine-grained uncrystallized substance of a blackish green colour, interspersed with thin laminæ of precious serpentine of a green colour. The rock of the softer species seems to be composed of these two substances also. It has a few small greyish white specks scattered over it: these are occasioned by some softer substance imbedded in it. I am inclined to think that this substance is compact tremolite. The softer species of rock may be scratched with the nail. It has an uneven fracture, inclining to earthy. This rock abounds with iron, insomuch that the magnet is enabled to attract very small particles of it. It resists a very strong flame of the blowpipe without being fused. The fine edges however of the harder species seem to yield a little to its action.

In the side of the hill, below the ridge of rock, a quarry is opened for the purpose of supplying the neighbouring road with stones. Here the rock is laid bare in large masses. It is accompanied in some places with asbest, and also with a fine white earth, which appears from the filaments which are mixed with it, to consist of asbest broken down in a state of partial decomposition.

Between the blocks which constitute the great mass of rock, a compact substance of a greyish white colour, consisting of an assemblage of crystalline spiculæ diverging from centres, is found. The same compact fossil occurs in the body of the rock, where there has been no rent. This I found to be compact tremolite. This substance assumes also another appearance of distinct and separate crystallization. Crystals of it occur in the fissures of the rock, in a state of promiscuous and thick aggregation. They are about three-fourths of an inch in length, at the longest; and consist of thin, tabular, rectangular prisms, the angles of which are, for the most part, rounded off, so that the section of the prism appears to approach to a long ellipse. Some of these crystals possess a vitreous lustre, and are semitransparent. In general their surface is dull, as if from the effect of weathering, and they are of a brownish ash colour resembling axinite.

Before the strong flame of the blowpipe, a fragment of a crystal melts into a greyish enamel. At the temperature 69. Fahr. I found the specific gravity of these crystals to be 3.20.

I shall not trespass upon the time of the Society by recording the minute detail of chemical experiments. I shall simply state the mode of analysis which I pursued, and the final result of it, so that I may furnish others with the means of judging whether I am warranted in calling this mineral substance a tremolite. The proportions of the several constituent parts of this fossil are given according to an average taken from 100 grains of the distinct crystals.

Acids produce very little effect upon the powdered crystals. No effervescence was produced to indicate the presence of the carbonic acid; neither could I detect any other acid as a constituent ingredient, by means of fusion with pure carbonat of potash, neutralizing

the alkali by pure nitric acid, and subjecting the solution to the ordinary tests.

Fifty grains treated in the usual way, with nitrat of barytes, &c. furnished an alkaline salt, which when united with sulphuric acid, assumed the figure of sulphat of soda by crystallization. But the quantity of this salt was too small to admit of being weighed.

One hundred grains exposed to a red heat for a quarter of an hour, were diminished in weight one grain. Pure alkalies do not effect the decomposition of this mineral so easily as they do in the state of carbonats.

One hundred grains were mixed and fused with 400 grains of dried carbonat of soda, in a platina crucible. Treated with muriatic acid spongy flocks of siliceous earth subsided. Ammonia precipitated from the decanted fluid a gelatinous matter of a reddish brown, which was sufficiently edulcorated; and after ignition, was treated with muriatic acid, which left a small portion of silica undissolved. Sulphuric acid separated some gypsum. The contents of the solution were now thrown down by means of an alcoholic solution of potash, and the brown precipitated matter was boiled with a superabundant quantity of the precipitant. The clear alkaline fluid was treated with muriat of ammonia, which separated some alumina, but in a quantity too minute for collection. Though this circumstance occurred twice, I am disposed to think that the presence of alumina should be considered as an accidental intrusion. The brown precipitated matter consisted of oxide of iron with a trace of manganese. The first solution from which ammonia could precipitate nothing further, was assayed with carbonat of soda, which separated a white matter, which was increased by boiling the fluid, even to dryness. It consisted of carbonat of lime and mag-

nesia. The lime was converted, by means of sulphuric acid, into gypsum, and thus severed from its associate.

The relative proportions of the ingredients are as follows.

Silica - -	62.2
Lime - -	14.1
Magnesia -	12.9
Oxide of Iron -	5.9
Water - -	1.
Of Manganese and Soda, a trace - - - - -	—
loss - - -	3.9
	100.0