

II.—*An Account of some Granite Veins at Porth
Just, near Cape Cornwall.*

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THE Granitic veins about to be described are situated at Porth Just, near Cape Cornwall, and below the tin-mine called *The Little Bounds*.

A brief and very general account of the adjoining rocks will first be given, which may be useful, preparatory to the description of any minute phenomena.

Towards the South, the cliffs are composed of granite; and, towards the North, of the *Killas* of our miners, or of what appears to me to be *Greywacké Slate*. The granitic and schistose rocks are separated by a large vein of *metalliferous quartz* (the *lode* of the mine above mentioned); which, besides oxide of tin, for which it is worked, contains some native copper, different oxides of iron, and a variety of

minerals. The granite, as is the case in most mountain-masses, varies considerably in appearance and composition in different places. The mica in some places is black, in others greenish, and in some white. The felspar is either white or reddish, and presents either small indistinct crystals, or large and regular ones. Neither is the difference confined to the colour and size of the constituent parts; the proportion of each is not uniformly the same, sometimes one ingredient, sometimes another preponderates; besides felspar, quartz, and mica, other substances may be observed in different places, as crystals of schorl or tourmaline, crystals of the oxide of tin, iron pyrites, and probably many other minerals might be found on more minute examination. In most places, the granite is traversed by veins of quartz, which in general are of a very small size, and run in various directions. They appear to belong to that class of veins commonly considered contemporaneous, and they constitute the matrix of the ores just mentioned. The killas or greywacké slate presents also some variety; it varies in hardness, in the proportion of mica and quartz it contains, and also in the proportion of the other ingredients; it varies too in the fineness and coarseness of its lamellar structure, and in the veins by which it is traversed. In most places, it resembles the *killas* that occurs at St. Michael's Mount; but no remarkable induration

of its substance is to be observed where it approaches the granite, or where the granitic veins pass. It dips towards the North, so that the upper ends of the strata are elevated towards the South, but at an angle which is less than 45° . In it quartz greatly abounds, and chiefly in the form of layers, which appear to be contemporaneous with the rock in which they exist. This opinion is drawn from the following circumstances: the layers are mostly horizontal in their general direction, in many places tortuous, never apparently connected with any particular veins, and they are very irregular in size and form: in this killas too are situated the veins which have a granitic appearance, and of which a description may be now given.

The number of these veins is considerable; they were not counted, but probably exceed fifty; their size greatly varies; the largest vein is more than five feet thick, and the smallest observed was not more than one-tenth of an inch in diameter. They run in different directions; some about W.N.W. and E.S.E., some about E. and W., and some nearly opposite, as N. and S., and consequently they occasionally intersect each other. In one instance of intersection, the disjointed parts of the vein running about N. and S. were *heaved* (as the miners in their expressive language term the fact,) about half an inch out of the course of the vein.

The position of most of these veins is perpendicular, or nearly so; this position to a considerable extent is well demonstrated in one vein by a perpendicular section of the cliff. In some places, the veins are observed to bend out of the perpendicular, and to approach more or less the horizontal line; in composition, and of course in general appearance, they differ very much.

Some of the veins, and one vein especially, very much resembles the most perfect crystallized granite, consisting distinctly of felspar, quartz, and mica. This vein is not above an inch broad in the widest part, and in the narrowest, just before it disappears, it does not exceed a line: it occurs near the lode. Some of these veins abound in quartz, and have very much the appearance of a fine, compact, granular, siliceous sandstone: of this description is the largest vein, which is more than 5 feet thick. It has a porphyritic appearance from the reddish crystals of felspar which it encloses; and it contains besides some crystals of tourmaline and a little mica. In some places, this vein is of a dark grey colour, and in others of a light reddish brown; it every where presents a very fractured appearance, and conveys the idea of fragments very closely compacted together; it runs about E. and W. and overlies towards the South. Some abound in felspar, and resemble veins of compact felspar rather than granite.

No where could any connexion be traced between the veins and the great neighbouring granitic mass; and most of the veins, even the smallest, appeared insulated.

Here it may be remarked that no small masses of granite were observed included in the *killas*, or of the *killas* in the great mass of granite; but small portions of *killas*, similar to the contiguous rock, were not uncommon occurrences in the granitic veins.

After this brief description, the theoretical bearings of the phenomena are the next subject for consideration. The highly inclined position of the veins, their crystalline nature, the neighbouring granite, seem circumstances favourable to the Huttonian system—that they were projected from below, and that they emanated from the adjoining granite. On the contrary, the variety of their composition, and the little resemblance which many of them have to the neighbouring granite, are circumstances unfavourable to their identity of origin. The existence of felspar, quartz, and mica, in *killas*; the existence of each of these substances (as was observed at Porth Just) in a crystallized state; the occurrence of *killas* abounding in felspar; the occurrence of horizontal veins of quartz in the *killas*, somewhat resembling the granitic veins, and containing a little felspar and mica, as is frequently the case; and, lastly, the existence of true granite in such a vein, are circumstances favourable to the idea that the

veins called granitic in this paper are *contemporaneous* with the rock enclosing them. The last-mentioned circumstance, the existence of true granite in a vein of quartz, is particularly agreeable to such a notion; and, as I believe it to be a new occurrence, a more minute description of the phenomenon may be useful, to give due weight to the argument. The vein of quartz in which it was observed, is very near the lode of "Little Bounds," in a rock of killas on the sea-shore: it is 3 or 4 inches broad, has numerous branches, contains very good crystals of felspar, and some coarse quartz crystals, with plates of mica; and in one place, by a happy mixture of these different substances, a compound is formed, which has very much the appearance of common granite, and seems only to differ from it in containing more mica and felspar than usual, and in being softer and less compact.

Such are a few of the arguments that may be brought forward on each side of the question: none of them are decisive; and they merely tend to shew that further enquiry is necessary before the phenomena of granitic veins can be satisfactorily explained, or reconciled to any system. Such an enquiry, it is greatly to be hoped, will be prosecuted in Cornwall, where so many circumstances are peculiarly favourable to the investigation; where so many veins of the kind exist, have already

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attracted the attention of strangers, and have become the subject of interesting discussion.

I cannot conclude this paper without requesting the attention of the Society to another spot where granitic veins occur, and in a peculiarly interesting form. *Pendeen Cove* is the place alluded to: here the granite veins are numerous and large; and, what is particularly worthy of notice, they may here be seen emanating from a great mass of granite, and passing into the killas by which the granite is covered,