A Visit to the Calcite Quarry in Iceland.

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In the summer and autumn of last year I paid a visit to Iceland, and as I had been told by my friend, Mr. Madan, that the difficulty of obtaining large pieces of clear calcspar for optical purposes had been exciting some curiosity as to the state of the quarry itself, and as the peculiarity of the deposit made it an object of interest, I thought it worth while to force Eskifjördhr[1] into my route. The narrow fjords of Sudhrmúla Sysla, of which Reydhartjördhr, the largest, bisects the East coast of Iceland, are cut out of an immense plateau, formed of horizontal sheets of volcanic rock—chiefly trachyte—between three and four thousand feet high. This has been subsequently eroded into sharp bare ridges with immense cliffs or steep slopes falling from them, parted by torrent valleys and fjords; the greater part of the district not reaching the present snow-line. It is on one of these slopes, which slants down at an angle of forty degrees into Reydharfjördhr, that the unique quarry of Iceland spar is found. It consists of a cavity in the rock about twelve yards by five, and some ten feet high, originally filled almost entirely, but now only lined, with immense crystals, which are fitted so closely together as to form a compact mass, like a lump of sugar with grains averaging ten inches across.

The Syslumadhur,[2] Jón Asmundarson Johnsen, had given me leave to examine the cave, and take as many specimens as I liked; but the permission was not of very much use, there being about five feet of water nearly all over the bottom; and such specimens as I did get involved doing severe penance in walking barefoot over the sharp crystals. The floor is covered with a thin layer of very fine chocolate-brown mud, which sticks as tenaciously to one's feet as to the crystals. I had to

[1] (dh = th in with.)

[2] Magistrate, public notary, receiver of taxes, liquidator, auctioneer, &c.

resort to tooth-powder to get the latter clean, though the great heaps of spar which lie on the path-side and in front of the mouth of the cave were all washed by the rain till they were as bright and transparent as ice. The water now running through the cave is incapable of forming calcspar. It appears, like the surrounding rocks, to contain an excess of silicic acid, and either etches the surface of the spar wherever it comes in contact with it, or covers it with stilbite, the characteristic zeolite of the doleritic and basaltic rocks in Iceland. The rock in which the cave is formed is a dolerite, and darker in colour than the surrounding phonolite, which is traversed by veins of black and green pitchstone. In the neighbourhood of the spar it is disintegrated, coloured slightly with green-earth, and full of microscopic crystals of stilbite and calcite.

The quarry was worked till 1872 by Herra Tulinius, a Danish merchant of Eskifjördhr—the trading station is an hour and a half's ride from Helgastadhir, the nearest farm to the quarry. (In Iceland all distances are measured in terms of the hour's ride, *tima*, and the day's journey, *leidh*.) The Icelandic government in that year bought a quarter share of the quarry, and stopped the work, so that Tulinius was glad to sell them the rest. Five years ago an attempt was made to re-open it. One man was employed, and after spending about a week in the cave, he succeeded in pumping out the water and extracting a fine block of clear spar, which was sold at a high price in London. Here, however, the work dropped, and in consequence Tulinius remains the proprietor of the whole of the calcspar that is available for physical work, and naturally sells it at a price that is calculated to make his very moderate stock last for a considerable time.[1] The reason of the inaction of the Icelandic government is not very clear, but as the working of the quarry is, perhaps from patriotic motives, delegated to Herr Gunnarsson, an *Icelandic* merchant, whose nearest warehouse is at Seydhisfjördhr, a good day's ride from Eskifjördhr, it is hardly to be expected that the buried treasure will soon see the light. Perhaps too the specimens of the best quality have been already removed. Certainly clear pieces do not constitute the great mass of the spar, and if M. Labonne, who visited the cave in May 1877 (the water being at that time frozen), could extract it 'en assez grande abondance' (*Comptes Rendus*, 105, 1144, 1887), he did not leave much exposed for me to take two years later. M. Labonne speaks in his note of ramifications into the environing rock which have never been worked, and suggests that this investigation might increase the

[1] It is sold by Thor E. Tulinius, Slotsholmsgade 16, Copenhagen K.

importance of the quarry; such ramifications as I could see were on a very small scale. On the other hand, the thickness of the deposit has not yet been ascertained. But it is said that the best pieces occurred near the surface. For the most part the calcite is rendered semiopaque by innumerable cracks, generally following the gliding and cleavage planes ($-\frac{1}{2}R$ and R), and apparently produced by the pressure of the spar itself, but sometimes following the conchoidal fracture: remarkable examples of the latter kind are in the British Museum.