

smooth, the quartz crystals having acted as a protection to the corroding fluid which destroyed the lustre of the r planes; but why the quartz crystals were deposited on the v planes by preference is apparently inexplicable.

A cleavage fragment was detached from one of the specimens, and after careful selection, a small brilliant fragment was measured on a Fuess goniometer, with the highest power. It gave a very bright reflection of the Websky slit, and the following readings.

The faces were within half a minute parallel to one another, and the two brightest images gave

$$rr\ 105^\circ\ 4\frac{1}{2}'. \quad \text{Miller, } rr\ 105^\circ\ 5'.$$

The scalenohedron form was determined from the crystal itself across bb''

$$v\bar{v} = 47^\circ\ 30'. \quad \text{Miller, } v\bar{v}\ 47^\circ\ 2'.$$

Since these specimens were raised, a very fine mass of crystals has been found in the same mine; this is worth describing.

It measures about two yards in circumference; the matrix is a thick layer of stout limpid quartz crystals, on which are deposited some half-a-dozen fine large crystals of lilac calcite, slightly polysynthetic in growth, similar to those described above; and also three or four large polysynthetic cubes of galena about one and a half inches square, beautifully tarnished, associated with a little copper pyrites and brown blende crystals. About the same time fine limpid white botryoidal calcite was discovered at the Roman Gravels, a mine adjoining. A fine specimen of calcite from the Camborne district, Cornwall, unique of its kind, is in the possession of Mr. Thos. Cornish, of Penzance. The crystals are white and semi-transparent, exhibiting the same development as those from the Tankerville mine. They are about an inch in diameter, and speckled on one side only by brilliant tetrahedra of copper pyrites.

The description of these specimens leads to a consideration of the cause of the numerous simple and modified forms of calcite. Dr. Irby, in his monograph on calcite, says that only one-seventh of the specimens he has examined have $r\ \{100\}$ in combination with other forms, and as a simple form it is extremely rare.

Credner also found, when making artificial crystals of $Ca\ CO_3$, that $r\ \{100\}$ predominated more frequently over the other forms when the crystals were obtained from pure solutions than when foreign substances were introduced. But the question arises, why should a trace of Mn be generally found in $r\ \{100\}$ crystals, as shown by the Tankerville, Iceland and Dauphiné crystals; also why should a trace of Mg be generally found in $e\ \{100\}$ crystals, as shown by the "nail-head" calcite of the north country,

and a trace of Fe in v $\{20\bar{1}\}$ crystals, as shown by the "dog-tooth" scale-nohedra of Derbyshire?

Possibly the answer may be that an infinitesimally small portion of an isomorphous chemical substance, when chemically combined, is able to induce a particular form.

Credner's experiments on the highly modifying influence of silicate of potash when introduced into the liquor, by which he caused numerous forms to grow on his artificial crystals of calcite, led him to infer that the presence of analcime with the crystals of calcite at Andreasberg and Lake Superior played the same part in the laboratory of Nature.

But the common "cannon spar" (hexagonal prism with basal plane) from the silver mines of Andreasberg is associated with the same minerals as the highly modified specimens. It seems, therefore, that we require more instances before accepting this proposition.

Another explanation offers itself in the effect of mechanically mixed impurities in modifying the form of a crystal, but the difference between the *density* of the impurity and that of the crystal may also affect the modification. For the large inclusion of quartz (sp. gr. 2.65) in the Fontainebleau calcite crystals (sp. gr. 2.72), and the fairly numerous crystals of quartz in the Tankerville crystals seem to accompany a simple form, while the native copper (sp. gr. 8.7) enclosed in the calcite crystals of Lake Superior accompanies very complicated forms. Or the answer may be that impurities, whether chemically or mechanically mixed, have little or no modifying influence, and the rate of deposition or the temperature of solution is rather the ruling force which governs the ultimate form or forms.

The crystallisation of certain artificial salts seems to show that the slower the growth the greater is the modification.

Again, the liquor in which a crystal is grown sometimes governs the form, as seen when crystals of alum are formed in urine, since alum crystals when grown in this manner give cubes, and rock salt octahedra.

The experiments on variation of temperature in modifying the form of artificial crystals seem to point to a complexity of form accompanying increase of temperature.

The result of the numerous experiments on the dimorphism of $CaCO_3$, makes it difficult to allow that the temperature, rate of deposition, or inclusion of impurities, are the whole cause of the numerous simple forms in calcite, since these experiments show that crystals of aragonite are formed at a high temperature, and even at a low temperature when the liquor contains gypsum or strontian.

There is still another cause to be mentioned—the effect of magnetic and electric currents on the growth and form of crystals—forces which after all may have more to do with the ultimate form than either temperature, rate of deposition, impurities, &c. We seek, alas, in vain for assistance in solving the question from any laboratory experiments at present published.

Thus all experiments on growing artificial crystals do not help us to understand why calcite should crystallise in different simple forms, which are characteristic of certain localities; though the fact may possibly be accounted for by the different degrees of resistance that the beds and vein-stone may offer to the magnetic or electric currents while the crystals are growing.

Description of a Crystal of Parisite.

By Monsieur GUYOT DE GRANDMAISON.

[Exhibited October 21st, 1884.]

OCCURRENCE. At the Emerald Mines of the Valley of Muso, New Granada, in a gangue composed of anthracitic calcite and pyrites. Lustre, vitreous to resinous; colour, yellowish brown to honey-yellow. An acute hexagonal pyramid with striations perpendicular to the axis. The crystal measures 84 millim. in length, and 12 millim. in thickness at the base.

The pyramid is perfect and its apex is intact.

All the specimens of Parisite which have been hitherto received, and are found in European Museums, exhibit a truncated hexagonal pyramid. This section is due to a very easy basal cleavage.