DEVELOPING CRYSTALLIZED MINERAL SPECIMENS

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Among the most attractive and highly prized specimens in any collection are the crystallized ones. The most valuable crystal is usually the one which is attached to the matrix in a manner which by suitable contrast of color and form serves to show forth its beauty and symmetry to the greatest possible degree. We naturally prefer also that the crystal should never have been removed from this matrix, nor artificially attached to either its natural matrix, or, (as sometimes occurs), to a kind of rock or mineral aggregate where it never belonged.

While it is true that an occasional specimen in which the crystals are imbedded in a solid matrix will break at the time of original collecting in such a way as to expose the crystals to the best advantage, yet probably the best of such matrix specimens seen in our collections have been "developed" to some extent. Crystallized material of this type is often put upon the market in the crude form in which it was obtained from the quarry. In such cases the wise purchaser will have ample opportunity to increase the beauty of appearance, as well as the value, of his "finds."

There are two principal ways of removing the superfluous matrix which surrounds and covers the crystals; the first is by solution, the second by cutting it out with tools. Regarding the use of either of these methods a few words of caution are necessary. The method of attack will vary with the nature of the matrix.

Dilute hydrochloric or nitric acid is used in the solution process. Limestone matrix is easily removed in this way; it goes into solution quickly and the only requirement for continued action is the addition of fresh acid when necessary. Other less common matrix materials may be treated in a similar way, but react differently; as, for instance, the natrolite surrounding the benitoite and neptunite crystals from California, which, during treatment with acid, forms a thick, insoluble jelly. This colloidal substance collects in a layer which protects the surface of the mineral below; it must be scraped off at intervals before fresh acid is applied. Above all things else it is necessary when treating specimens with acid, to make sure that the crystals which are to be brought into relief are not themselves attacked by the solvent, which would result in the destruction of the luster of crystal faces or of the solid angles of the crystals. Many Franklin Furnace specimens have been permanently ruined in this way. Careful reference to a standard textbook on mineralogy will determine this important point in advance. After treatment with acid, specimens should be soaked for some time in water, preferably warm, providing, of course, that the crystals are insoluble in water, or in a weak ammonia solution, to remove and neutralize all traces

of acid which may be left. Acid remaining gives a yellow color, acidic odor, and corrosive action on labels and trays.

For removal of matrix which is not attacked by acids, small steel chisels or pointed instruments are used. The writer has used straight sail-needles, whose points were renewed at intervals on a grind-stone. In the use of pointed instruments, extreme care and patience are necessary, as a single slip may damage a valuable crystal beyond repair. The chisel should be held firmly and the hand braced against the specimen or its support. Perhaps the greatest danger of injury to the crystal occurs when the surrounding material suddenly breaks away under the blows of the hammer, exposing the crystal face just beneath. In working away the matrix close to a crystal, the direction of the blows should always be away from it. This avoids bruising of crystal faces. The hammer itself should be light in weight, with a flat face, preferably square. The handle should be of wood, long and flexible. The blows should usually be short, sharp taps, causing the least possible jar to the specimen. It will be found that when excessive jar occurs, the most severe breakage is likely to be on the side of the specimen farthest from the point where the blow was delivered, as the stresses are transmitted thru the specimen to that point. The specimen can be supported in some way to deaden the jar—in a box of sand, or upon a cloth bag filled with sand. The matrix should be removed slowly, grain by grain, if granular. Thus the quartz of pegmatite veins is easily removed when it is granular, especially when somewhat shattered by quarrying operations. Other kinds of matrix, like the sericite schist in the cyanite-staurolite specimens of Switzerland will separate in thin flakes. Care should always be taken to remove as little as possible at a time. Very hard materials, like massive or crystalline natrolite, can sometimes be first attacked with acid and then removed with the chisel.

It must be remembered that the average crystal in a matrix like a limestone or a pegmatite vein has no natural cement attaching it to its matrix; it simply lies in a smooth cavity whose walls correspond to its crystal faces. Hence enough matrix should be left surrounding the crystal to hold it firmly in its place.

Crystals imbedded in solid vein material (especially in veins or dikes in metamorphic rocks), will occasionally be found to be naturally shattered by earth movements into many small pieces, some of which fall away when the crystal is exposed. This is true, for instance, of some garnets, tourmalines, and apatites from New York City. In other cases, portions of brittle crystals may be chipped off with the matrix, to which portions, especially the solid angles, sometimes adhere. In case breakage of crystals occurs, it is frequently possible to repair them, filling any small cracks with a paste made of small fragments of crystals of the same kind and color, mixed with glue.