

### Selected Matter.

#### THE ART OF COLORING CORNELIANS, CHALCEDONIES, AND OTHER KINDRED MINERALS.

In the name of *Gemma*, the ancients embraced more precious stones than we of modern date do by that of jewels; this only comprises precious stones which, from their color, transparency, fire, hardness, scarcity and other properties, are eminently qualified to serve as adornments. The ancients held in high esteem the many varieties of quartz, half jewels, parti—as well as singly colored, or veined, cloudy, or spotted, because they furnished an excellent material for the pursuits of art, and as being better adapted to the art of cameo cutting. Pliny mentions an agate which, with its natural spots, represented Apollo surrounded by the nine muses. It is not a matter of astonishment that the ancients should have practiced every means within their knowledge to alter or heighten the colorization of the various tinged quartz classes, and, indeed, Pliny states that there is no falsification as lucrative as that of the artificially coloring gems. They were manufactured of glass and paste, and cemented upon tablets; especially the sardonyx was much imitated. The same author states that, among other manipulations, the quartzose gems were boiled in honey for seven days. The agate cutters of Idar and Oberstein made use of the same means to change feebly-colored gems—chalcedonies, cornelians, into pronounced and very beautiful onyxes. The gem cutters of Italy in former years visited these gem producing regions and eagerly bought up everything in the market, as they understood the art of artificial staining, until some traitor among them gave or sold away the secret which Pliny already mentions as being practiced at the time of the birth of Christ.

This art is based upon the peculiarity that some of the bands of the chalcedony are more porous than others, and will imbibe coloring fluids, whereby they may be changed into onyxes, specially adapted to cameo cutting, owing to their different shades; and even agates intended for other purposes, may be considerably enhanced by the procedure.

An empirical way of ascertaining whether a stone will imbibe color is practiced by the gem merchants, by breaking off a small piece and wetting the larger one with the tongue; if several strata imbibe

the fluid, the stone is deemed good. Very large ones plentifully veined, especially those containing red streaks, are valued highly, increasing with the number of veins. One was found in 1844, weighing 100 pounds, which sold for \$600 on the spot; it was cut into cameos, at an expense of \$150, which brought, when sold, \$2,000.

The coloring is done in the following manner. The stones are first washed very clean, to free them from all extraneous matter, and dried in the ordinary temperature; they are next immersed in a solution of honey and water; the pot must be new, or at least, very clean, above all, free of grease. It is placed into hot ashes, or upon a warm stove, the fluid, however, must never come to ebullition, and the stones are at all times kept under water by adding a quantity every day or two, to replace that which evaporated. The stones thus are left for two or three weeks, then taken out, washed, and put into another pot, into which sulphuric acid is poured, to completely cover them. The pot is covered with a slate, placed into the hot ashes, and surrounded with live coals. The large so-called soft stones will be found colored within a few hours, others require an entire day, while again others do not become stained. When to satisfaction, the stones are taken out of the acid, washed, dried upon a stove, cut and put into oil for a day, which causes any previous little cracks to disappear, the stone becomes more fiery, the outward oil is afterward removed by rubbing with bran.

The previous insignificant-looking light grey veins will, in proportion to this porosity, be found stained brownish grey or black; the white ones have turned purer, and their veins have become brighter in color. The chemical process which took place is very easy of solution; the honey penetrated into the pores and has become carbonized by sulphuric acid. White and many red streaks appear to be unimperfectible, but the intensity of their color is heightened.

The so called Brazilian cornelian is also "cooked" as in the preceding manner. Great quantities of the crude stone are imported into Northern Italy, and those adapted to cameo cutting bring high prices, sometimes \$2,000 per cwt. These cornelians contain an oxyhydrate of iron, and are generally entirely unimpregnable; the reddish tints are often deadened by being carbonized, and either are not visible, or

appear as an admixture of the grey and black colors, hence they often play into brown.

Pliny, who simply speaks of the method from hearsay, mentions the treatment by honey alone, and omits the sulphuric acid, without which, as is clearly perceptible, no colorization can take place. But as his mention may be accepted as proof positive that the Romans understood the art of coloring, we may go a step further and accept that they were also acquainted with sulphuric acid and its action. No direct proofs can be cited, but the acid is, as is well known, a product of volcanoes, and it is not difficult to imagine that they fully understood it, since they were very well acquainted with sulphur and the natural sulphurets. If they possessed no direct sulphuric acid, they at least were acquainted with solid and liquid substances which contained the free acid, and which answered their purposes.

In the already mentioned districts of Oberstein and Idar, the parties engaged in the art also understood how to produce a beautiful citron yellow. The following is the process. The stone is dried for several days upon a stove, which must not be too warm, however; it is next put into a clean pot, which is filled with commercial muriatic acid, a cover is cemented over it with clay, and the pot is left untouched for two or three weeks, remaining in a warm place. The chemical action is open to debate, whether the yellow color is produced by a salt in the acid, which unites with some free element contained in the stone, or whether the coloring principle is contained in the acid itself, and is imbibed by the stone.

Among the gems cut by the Greeks and Romans, many specimens are found with blue veins. It is supposed that they were colored artificially, but the secret has died with them. The cameo cutters of Idar use the following method for blue: The stone is placed into a solution of salt of oxide of iron, and afterwards saturated with a solution of prussiate of potash. The color called Prussian blue is thus produced.

Or a solution of ferrous salt is made. The stone is placed at first into a solution of prussiate of potash, chloric gas is conducted upon it, whereby potassium ferridcyanide is produced, which, when the stone has been saturated in the solution of ferrous salt, produces Prussian blue, and colors the different bands. A third