NOTES
· AND ·
NEW TECHNIQUES

ARTISTRY IN ROCK CRYSTAL: THE VAN PELT COLLECTION

By John Sinkankas

Harold and Erica Van Pelt of Los Angeles are known worldwide for their superb color photography of gems and minerals. A well-kept secret, however, has been their remarkable proficiency in the lapidary arts, specifically in the production in traditional styles of many important rock crystal objects, including candlesticks, vases, paperweights, and polished quartz crystals containing various mineral inclusions. Agate, amethyst, and other gemstones are also employed. For the most part, the machinery used to create these objects was designed or modified by the Van Pelts themselves and includes devices for sawing, grinding, and polishing. A step-by-step procedure for making a hollow ostrich egg, completely covered by triangular facets, is explained.

The purest form of quartz, known as rock crystal, is one of the most abundant and widely distributed of all minerals. Relatively few places, however, provide clear crystals large enough for lapidary work of the scale covered in this article; currently, Brazil is the primary source of large pieces of gem quality. This fascinating substance was used by the ancient Egyptians, Chinese, Japanese, and by many cultures around the Mediterranean. Marvelous carvings were made from it by pre-Columbian Indians of the Americas.

In later years, large crystals found in the Alps enabled Renaissance lapidaries such as the celebrated Miseroni family of Florence (late 16th century–17th century) to create outstanding works of art as urns, vases, bowls, cups, and figurines. These were often engraved with scenes and figures in shallow relief. Many were complemented by precious-metal attachments and joints on which were expended the best efforts of master enamelists and jewelers (Michel, 1960). Examples of such masterpieces can be seen in most major art museums, notably the Metropolitan Museum in New York, the Victoria and Albert in London, the Green Vaults in Dresden, and the Residenz in Munich (Strohmer, 1947; Rossi, 1954; Morassi, 1963; Menzhausen, 1968).

Because of the enormous amount of labor required to work rock crystal, fewer objects were made from it as subsidies from European royal houses gradually fell away. Despite the availability of suitable rough, only the Chinese continued to produce large carvings into modern times, although smaller objects of rock crystal—such as spheres, seals, figurines, and the like—were made by the artisans of the Urals in Russia, the famous carvers of Idar-Oberstein in Germany, and elsewhere in the Orient and in Europe.

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Figure 1. The Van Pelt quartz egg measures 5 in. (12.7 cm) high × 3 in. (7.6 cm) in diameter. The top has 176 facets, and the bottom 240. The walls of this hollow egg are 3 mm thick. Photo © 1982 Harold and Erica Van Pelt, Los Angeles, CA.

In part, the decline in carving large objects from rock crystal may be attributed to the appearance of high-quality glass, a much softer and far more easily worked material. Much of the initial shaping labor required to "rough out" a rock crystal urn, for example, is completely eliminated in glass manufacture, where the approximate shape of the finished object can be obtained directly from molten glass. Furthermore, after suitable surface treatment, such as engraving or grooving, a finished object in colorless glass is scarcely distinguishable by the casual glance from its more precious counterpart in rock crystal.

Thus it is news indeed to find a resurgence of traditional rock crystal lapidary work taking place in a modest workshop in Los Angeles by the team of professional photographers, Harold and Erica Van Pelt. Both are known worldwide for their skill in realistically and artistically portraying gems and minerals, as seen on the pages and covers of *Gems & Gemology* and many other journals and books. This article examines the origins of the Van Pelts' interest in carving and faceting gemstones, and, specifically, the techniques they use to create fine, large objects such as the hollow egg in figure 1 from rock crystal.

FROM PHOTOGRAPHERS TO LAPIDARIES

The Van Pelts' interest in minerals and gems was aroused in the late 1960s, when they were first persuaded to try their hands at photographing mineral specimens. Years of experience in the photography of art objects of all kinds, including sculptures, which are notoriously difficult to photograph well, aided their early success in depicting mineral specimens and faceted stones.

This interest in minerals led to the accumulation of specimens for themselves, and eventually the desire to create from gem materials

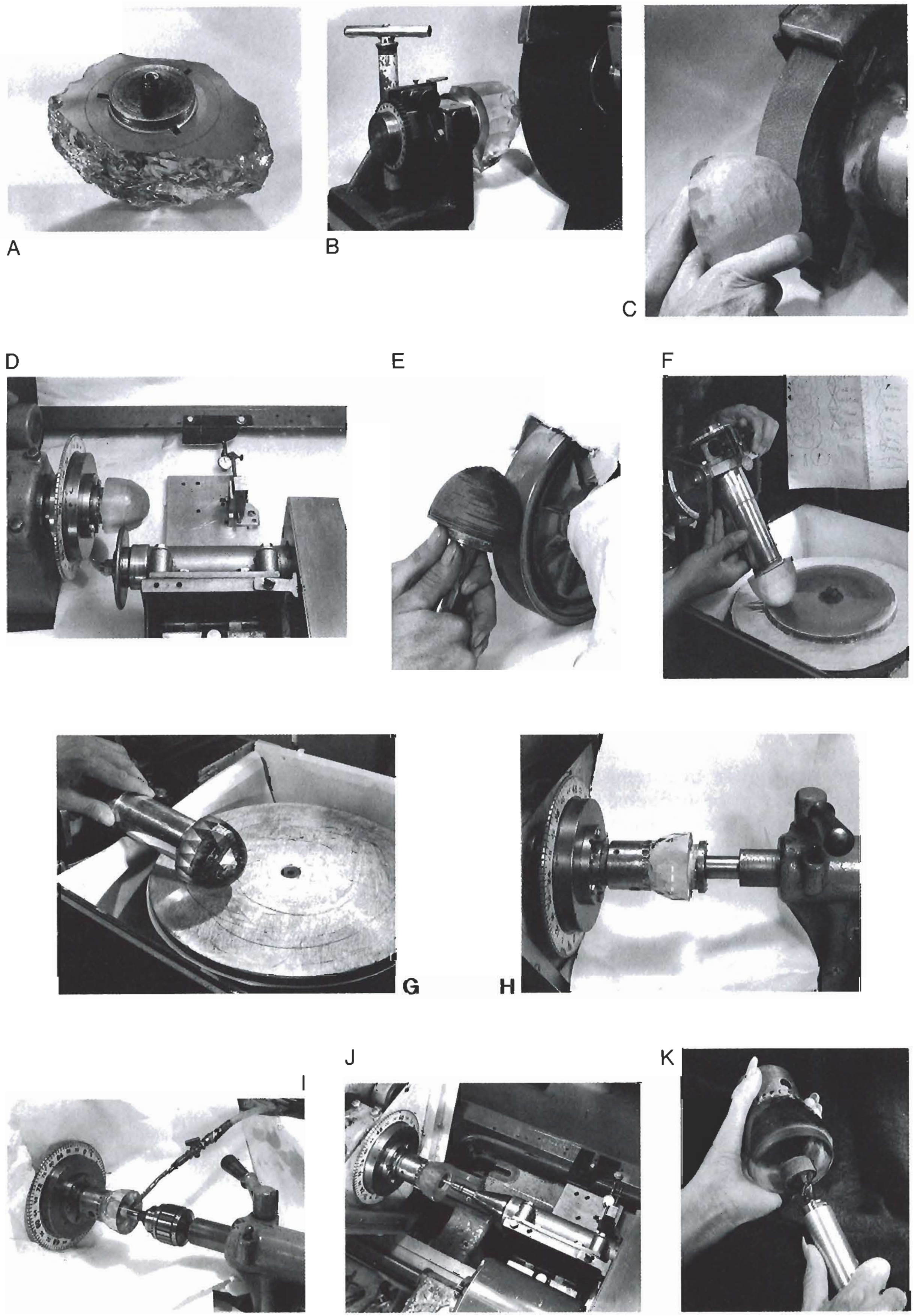
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Figure 2. The procedure used to fashion the faceted hollow quartz egg. (A) The sawed block of rock crystal with cross-section profile marked and dop attached with epoxy. Note the cardboard strips, which raise the dop enough to permit ingress of a hacksaw blade when later transfer takes place. (B) The rock crystal block is mounted in a rotatable tool for sawing off strips to achieve an approximate cylindrical profile. The index gear at left allows rotation by an equal number of degrees for each cut made by the diamond blade at right. (C) After the initial sawing, the rough profile is ground in by hand against the diamond-charged Crystalite turbine wheel shown at right. (D) Accurate profiling is accomplished using a Crystalite grinding wheel, ¼ in. × 4 in. radius (foreground), adjusted to the profile template shown in the background. (E) The marks left by the profiling operation are ground out using an 8 in. Crystalite 220-mesh diamond wheel. Great care must be taken not to overgrind. This step establishes the basic reference surface for faceting. (F) The facets are ground using a large, home-designed machine with a Crystalite 8 in., 100-mesh diamond disc. The diagrams on the wall show the positions and inclinations of the facets, which gradually decrease in size toward the tip of the egg. (G) The facets are prepolished on a wood lap, using Crystalite 15-micron diamond compound with Crystalube for lubricant. (H) The stone is turned around using the lathe to provide alignment. The old dop is on the right and the new dop is on the left. (I) The old dop has now been removed, and the first drilling with a Crystalite ¾ in. core drill is in progress (note the oil-coolant feed pipe). The narrow core is knocked out later to leave a cylindrical recess. This step is followed by two other core drillings, each of larger diameter. (J) The rough interior is now cut by the use of a suitable diamond wheel attached to the post at right, while the egg itself is slowly rotated at the left. (K) The interlocking rim recess is machined before the egg is removed from the lathe. A series of felt wheels charged with cerium oxide provide the final polish.

something that would be artistically satisfying yet different from the usual projects undertaken by beginning lapidaries. Their experience in the art world suggested a revival of the art of carving large objects from rock crystal and other hard and compact gem materials. Using *Gem Cutting* (Sinkankas, 1962) as a guide, they made or modified as necessary the machinery needed to solve the problems of rapid, safe removal of unwanted material and at the same time insure geometrical accuracy in the finished work. Among their modifications and alterations are a slab saw for blocking out rough, fitted with clamps and adjustment devices to hold the stone at preset angles; a smaller "trim saw" with a unique raising platform to regulate depth of cut; an arbor with grinding wheel attachments and special elongated shaft extensions to hold grinding, smoothing, and polishing wheels and points; a drill press for coring and hollowing; a lathe for turning round sections; a lap for flattening large plane areas; and a very large, strong, faceting head to apply facets to large objects.

One of the most intriguing rock crystal objects made by the Van Pelts is the ostrich egg in two halves shown in figure 1 and on the cover of this issue. Each of the halves is accurately faceted to provide exterior surfaces entirely covered by small, polished triangles. The smoothly rounded interior is hollowed out to very thin walls, and the halves interlock by means of machined recesses along their rims. It is truly a masterpiece of design and creativity. The closed egg is 5 in. (13 cm) tall and 3 in. (7.7 cm) wide, and the walls are about 3 mm thick. The procedure for making the egg is briefly explained below to show the lapidary problems involved and how they were solved.

FASHIONING THE HOLLOW EGG

The first step was to saw an almost flawless piece of rock crystal in half, one half for each half of the egg. One of the halves was then attached with epoxy to the dop shown in figure 2A. Three spacer strips of cardboard were used to raise the quartz slightly above the dop to allow ingress of a hacksaw blade for later removal of the dop. The dopped block was then inserted into the special device shown in figure 2B; this, in turn, was locked into the feed carriage of the slabbing saw to make the cuts shown in the photograph. After each cut, the block was rotated a like number of degrees to a new position to achieve a rough circular outline.

In the next step, the quartz block was held against a diamond-charged wheel, shown in the background of figure 2C, until the desired shape was achieved. Then, as shown in figure 2D, the block was slowly rotated in the lathe head at the left while being ground with the round-nose diamond wheel in the foreground. The in-movement of the grinding wheel was regulated by the template in the background to insure an accurate profile. Another hand-grinding operation followed to remove the excess material between the grooves, as shown in figure 2E, and to establish the final surface for faceting.

The dopped stone was next inserted into the faceting machine in figure 2F for cutting the numerous facets according to the plans seen here on the wall charts, which detail the steps, the angles between them, and the peripheral arrangement of the facets. After cutting, the facets were polished on the wood lap shown in figure 2G. The stone was now ready for turn-around and hollowing.

Figure 2H shows the redopping procedure, in which the lathe itself was used as an accurate axial alignment tool. The new dop at the left is a tube of metal which was bonded to the stone with epoxy. The tube has teeth cut into its edge which allows the epoxy solvent better access when the dop must be removed from the stone. Alternate teeth are covered with tape to prevent direct and possibly damaging contact of tube and stone. The first dop, on the right, was removed and the egg-half positioned for the initial hollowing operation, as shown in figure 2I. Here a hollow diamond-charged drill was used to cut a core to suitable depth, with care being taken to insure that the cut was not made too deep. The slender core was then knocked out and a large core drill substituted to remove further material; the process was subsequently repeated once more using a still larger core drill.

The roughly hollowed recess was then ground smooth with a diamond wheel set off-center as shown in figure 2J, again using an internal template, visible here in the background on the right. This template helps the cutter maintain uniform thickness and parallelism of the curved walls. Because of the limited availability of grinding wheels that could accommodate the gradually changing curvature of the inside, it was necessary to hand-finish the interior as shown in figure 2K. For this step, a resilient drum, covered by diamond-coated cloth, was brought into play. Other drums of different shapes were used to methodically smooth the interior and were followed by polishing wheels made of felt and charged with a slurry of cerium oxide. Note also in figure 2K that the interlocking rim previously mentioned has been machined in place; it was later smoothed and then fitted with a metal, gold-plated rim cemented in place with epoxy resin.

If all of this seems difficult and tedious, be assured that it is. As each thin-walled creation neared completion, the mechanical problems were further burdened by the constant dread that one slip would ruin the work and nullify hours and hours of labor. A decided advantage of hand-holding the object during the last stages of smoothing and polishing is that build-up of excessive and possibly damaging heat can be detected and counteracted quickly.

SOME NOTES ON OTHER VAN PELT PIECES

A few words of explanation are in order in connection with other objects made by the Van Pelts, such as those shown in figures 3 and 4. As a matter of convenience and safety, it is often better to make vases and urns from several sections of quartz, with the faceted or fluted sections mated by peg-and-socket joints machined into the pieces themselves and finally cemented with colorless epoxy. Joints of this kind may be covered with gold bands as shown in the slender vases of figure 3, where the separate segments have been individually faceted. On the other hand, the goblet shown in figure 4 has had its smoothly curved flutes cut into the rock crystal by hand. For the most part, the Van Pelts now do their own metalwork, gem setting, and plating. Other objects made by the Van Pelts include spoons fashioned from colorful Uruguyan agate, a series of paperweights

Figure 3. Rock crystal vases measuring 10½ in. (26.6 cm) high × 3 in. (7.6 cm) in diameter at the top and 3½ in. (8.8 cm) in diameter at the base. Each vase has six sides and 96 facets. The tops of the covers are made of pink tourmaline and green tourmaline, respectively. Photo © 1982 Harold and Erica Van Pelt, Los Angeles, CA.

Figure 4. Rock crystal vase measuring 4½ in. (11.4 cm) high × 3¼ in. (8 cm) in diameter. There are 24 flutes on the body and the base. The natural quartz crystal in the background, from Arkansas, is representative of the material used for fine pieces such as this. Photo © 1982 Harold and Erica Van Pelt, Los Angeles, CA.

made from rock crystal, agate and petrified wood, also pill boxes and other types of small containers.

While the production of these objects is a severe test of patience and skill, the Van Pelts are emphatic in pointing out that the greatest initial difficulty is in finding suitable rough. Large masses of rock crystal and some other gem materials are available, to be sure, but careful examination usually shows that most are unsatisfactory, containing either too many flaws in critical areas, or, far worse, fractures that could lead to disintegration before a piece is finished. The scarcity of large rough insures that few rock crystal masterpieces will ever be made. The Van Pelt creations, none of which has ever been sold, are unique in today's lapidary community.

Editor's Note: The hollow quartz egg is currently on display at the GIA headquarters in Santa Monica, California. The vases shown here will, together with other pieces fashioned by the Van Pelts, be on display at the Tucson Gem and Mineral Show, February 10–13, 1983.

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