
ENGRAVED GEMS: A HISTORICAL PERSPECTIVE

By Fred L. Gray

Such innocuous events as the creation of the pre-gummed envelope and the modern postal system contributed to the demise of the engraved gem seal. During the thousands of years that the seal served as man's most important mark of identification, however, gem engraving reigned as one of his most significant art forms. This article traces the history of engraved gems from primitive amulets through cylinder seals, scarabs, scaraboids, and ringstones, to the more recently introduced cameos. Also discussed is the engraving process itself, how to evaluate an engraved gem, and more recent developments in the materials and methods used to engrave gems.

For virtually thousands of years in the early days of Western civilization, the words *gem* and *engraved gem* were virtually synonymous. The earliest engraved gems evolved from amulets on which gods as well as everyday images such as animals were carved. As these carved charms came to symbolize the owner or wearer as an individual, they developed into seals with which he might mark his property or, as civilization became more sophisticated, he might use as tools in barter and trade. These seals became the personal mark, or "signature," of their owners. As such, they were often worn on the clothing of the bearer, attached to a thong around his wrist or neck or, in later years, mounted in a ring. With time, the ornamental value of the seal began to equal its utilitarian value. Eventually, a form of engraving gems for purely ornamental value emerged—and from the Hellenistic period of ancient Greece to the present, cameos have played an important role in the engraver's art.

The purpose of this article is to provide a historical overview of engraved gems, including an introduction to the different types as well as the techniques and materials used to produce them. Although particular attention is given to the early history of gem engraving, especially the role of seals, we will also take a brief look at the current status of engraved gems and important considerations in their evaluation.

ABOUT THE AUTHOR

Fred Gray, a former instructor at the Gemological Institute of America, is currently a gemologist with Richter's of Nashville, Tennessee.

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INTAGLIO AND CAMEO

Gem engraving is a miniaturistic art form whereby designs are cut into or on the surface of a gem. The outstanding feature of this type of carving is the small scale of the art: gem engraving is done most often on a surface less than one inch (2.5 cm) in diameter. Also known as glyptic (from the Greek word *glyptos*, meaning carved) art, gem engraving is often distinguished by the great attention to detail accomplished on such a small surface.

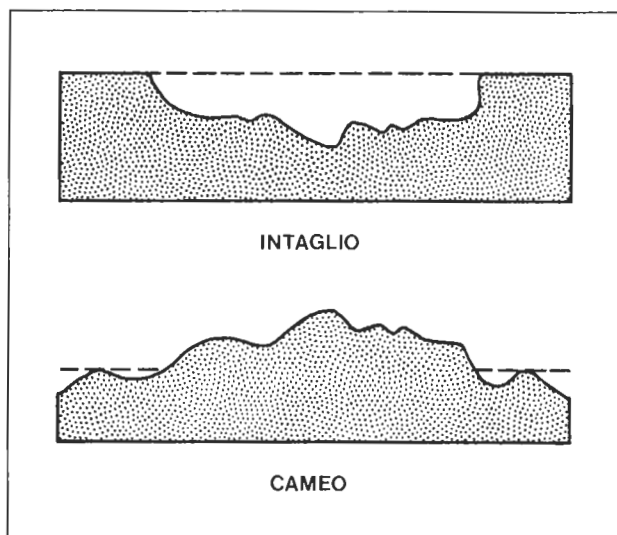


Figure 1. The intaglio (used primarily for seals) and cameo are the oldest forms of engraved gems.

For the most part, engraved gems can be divided into two distinct types: intaglio and cameo (see figure 1). An intaglio is made by grinding away material below the surface of the gem, leaving an inverse image. Detail is achieved by varying the depth of the engraving. A cameo is the opposite of an intaglio: that is, the subject is sculpted above the surface of the gem, appearing in relief on stones usually of two or more different-colored layers. Most cameos utilize several layers of material to increase the definition of the carving. Another type of engraved gem occasionally encountered is the chevet (also called chevee or cuvette), in which a raised figure rests in a background sunk below the surface. Because the chevet is a relatively modern development, it will not be discussed further here.

THE ENGRAVING PROCESS

The earliest gemstone engraving was accomplished simply by drawing a piece of hard stone or metal against a softer material to produce grooves. The results may have been adequate, but the finished pieces lacked subtlety in design and were often very crude. This simple technique was eventually followed by the use of a drill to form crude round depressions. The earliest drill was a simple hand-held device driven by a bow that was moved back and forth (figure 2). The drill shaft was made

of wood, to which a small piece of flint was attached as a bit (Sutherland, 1965; King, 1885). The vertical drill, which was very difficult to hold steady, was eventually replaced by a horizontal version, which allowed better control of the work in progress by freeing the hands to manipulate the gem.

Fine-grained rock (serpentine, soapstone, etc.) was often used for the earliest engraved seals because of ease of carving (see cover). We do not know when metal points replaced the stone points on the drill (although King, 1882, suggests that it may have been as early as 2000 B.C.), but we do know that metal points used in conjunction with emery or another hard powder (added as the drill revolved to do the actual abrading) enabled the cutting of harder materials such as jasper and carnelian (again, see cover). Varieties of chalcedony were overwhelmingly favored because of their availability, the predictability of their lapidary behavior, and their great strength, which helped assure the carver that he would not break the piece before he was through (John Sinkankas, personal communication, 1983).

When the early glyptic artists replaced their drill bits of stone with metal tools and cutting wheels, they had essentially the same equipment that engravers use today (Gerhard Becker, personal communication, 1983). For convenience and to increase the speed of the drill, contemporary craftsmen use machine instead of man power. Another modern development is the replacement of emery by far faster-cutting diamond powder.

The actual engraving process is exacting and laborious. Because of the small scale involved, it is one of the most difficult of the sculpting arts. For an intaglio, where the design is to be sunk below the top of the gem, the surface is usually given its final polish at the outset, and the design drawn on that surface. The engraving begins with larger cutting tools: wheels, and ball- and oval-shaped bits. In the later stages, tools as small as the head of a pin are used for the detail work. Lastly, the actual engraving may be polished or textured, depending on the detailing desired (Renton, 1896).

It is interesting to note that magnification is not commonly used during the engraving process. The slurry of polishing compound obscures the carving in progress. The hands and cutting tools also make direct observation of the work difficult. The cutter must rely mainly on the feel of the carving to execute the design. To check his prog-

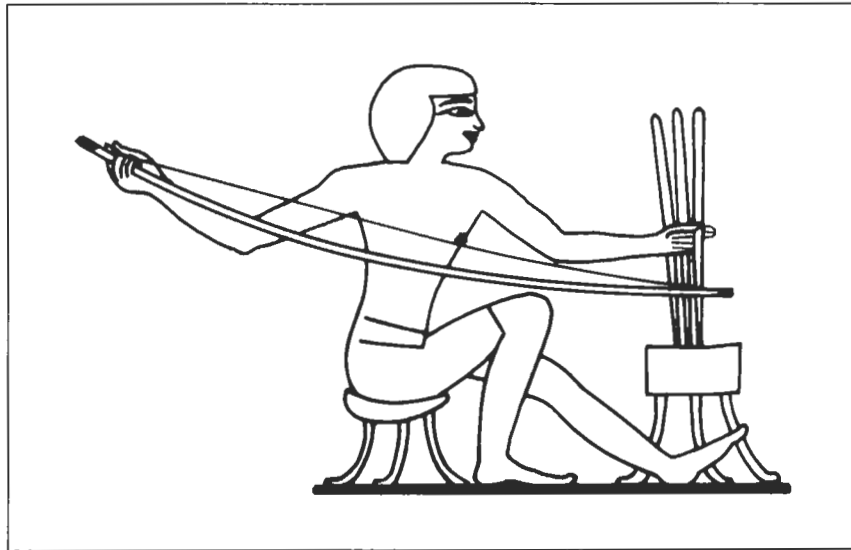


Figure 2. This Egyptian drawing shows an early technique for drilling holes in stone which involved the bow drill. The bow caused the drill bit to revolve, thereby boring a hole into the stone. Modern historians surmise that this same equipment was also probably used to engrave gems.

ress, however, the craftsman constantly presses the stone into clay and examines the design in positive with a loupe. We have little information to suggest that magnification of any form was used by ancient engravers, although a current theory holds that these early craftsmen commonly were myopic, thereby naturally possessing better vision at a close range (Michael Stubin, personal communication, 1982).

THE HISTORY OF ENGRAVED GEMS

The Introduction of the Seal. The history of stone engraving is as old as organized societies, having originated when the first congregations of man developed socially and economically to a point where there was a need for sealing property. Worm-eaten wood pressed into clay was one of the earliest means, as the random pattern of these bits made each seal unique (King, 1885).

The engraving of harder materials specifically to serve as individual seals was the next logical step. An important factor in this progression was that prehistoric man had used and worn crudely carved amulets, decorated with the animals and religious figures so central to his world. As the concept of personal property—and later those of trade, taxes, banking, and the like—required the use of a personal mark, the evolution of these amulets into seals was a natural development (Sutherland, 1965). For convenience, the seals were often worn on the owner's clothing or at the neck or wrist. With time, their function became ornamental—as jewelry—as well as utilitarian and religious. The widespread acceptance of seals is

undoubtedly due to the fact that they satisfied so many needs for newly civilized man.

The earliest seals were probably introduced between 6500 and 6000 B.C. in the neolithic cities of Mesopotamia (Sutherland, 1965). These primitive seals are extremely varied in shape and material. Most were made from fired clay, but locally available soft stones were also used. Such seals were shaped into cones, rectangular tablets, bean-like forms, and the like. Vast numbers of these have been found, usually with religious motifs or with simple geometric designs.

Cylinder Seals and Scarabs. The first important group of engraved seals were the cylinder seals (see figure 3 and the cover), which made their appearance in the river valleys of southern Mesopotamia around 3300 B.C. (Wiseman, 1956), or approximately the same time that writing was first employed as a means of communication. Cylinder seals were used to sign documents, to seal goods for barter or tax purposes, and as trademarks on objects such as pottery. Their shapes made them ideally suited for rolling around the openings of jars, bottles, sacks, and other containers to discourage tampering. Locally obtained materials such as hematite, serpentine, jasper, and chalcedony were most commonly used to make cylinder seals, but the highly prized lapis lazuli was occasionally obtained via trade (Wiseman, 1956).

The Egyptians also used the cylinder seal, but they eventually created a seal that was both of greater religious significance and served their needs better: the scarab (figure 4). Whereas the cylinder was ideally suited for sealing large ob-



Figure 3. The cylinder seal represents the first important group of seals used by man. An inverse image was engraved on a cylindrical piece of stone so that it could be rolled out along wet clay, wax, or other impressionable substance to produce a positive image. This Assyrian cylinder seal, made of chalcedony, dates from approximately 2000 B.C. It measures 34 mm long × 17 mm in diameter. Like most cylinder seals, it has a hole going through the middle lengthwise to accommodate a string or thong for wearing by its owner. Photo ©1983 Harold and Erica Van Pelt.

jects, the scarab was more appropriate for stamping paper documents made from the papyrus indigenous to Egypt.

The scarab seal took its convex shape from the scarab beetle, which symbolized the sun god and eternity in ancient Egypt. On the flat bottom side, the artisan engraved hieroglyphic characters which served as the bearer's mark (see the large white stone on the cover). Most early scarab seals were made of soft materials such as faience, a glazed earthenware pottery. In later periods, hard stones such as carnelian, rock crystal, and amethyst were more often employed. According to Ball (1950), Egypt was the world's greatest producer of gems from approximately 3200 to 200 B.C.

The Classical Age: Scaraboid, Ringstone, and Cameo. Seals were produced and used most intensively during the classical period of ancient Greece and Rome (approximately 500 B.C. to 400 A.D.). By this time, the role of engraved stone seals was

firmly established; virtually every important culture had adopted them. Although most seals were very rudimentary, not infrequently they were engraved with great technical skill. The classical artisans of Greece and Rome carried engraving (now a distinct profession) to a level higher than ever seen previously. Their designs were imaginative, and their technical skills in working with hard stone equal to the demands of their creativity.

Although the earlier cultures of the Minoans and Mycenaeans knew how to work the harder, more durable materials such as quartz and chalcedony, the destruction of these cultures before 1100 B.C. meant the demise of their technical knowledge as well. It was not until the seventh century B.C. that the Greeks learned from the Phoenicians how to use abrasives on hard stone. From these great "merchants of the Mediterranean" they also acquired the form of the scarab, which the Phoenicians had adopted previously from the Egyptians. To this basic shape they added

motifs inspired by both events and figures in their daily lives and by the many colorful legends surrounding the gods they worshipped, making their seals look distinctively Greek.

As the Greeks gradually lost interest in the scarab, because it was not relevant to Greek religious symbolism, a new form of seal—the scaraboid—appeared. It was also oval in outline, but the scarab back was replaced by a simple unornamented dome (figure 5). The seal engraving was still placed on the flat bottom side which was worn toward the body.

The scaraboid, like the Greek scarab, was made almost exclusively of chalcedony, a natural choice because of its durability, availability, and attractiveness. Another important advantage is that sealing wax does not stick to this cryptocrystalline mineral. The varieties carnelian and sard were used for the earlier scarabs because their darker color showed off the engraving of the beetle to great advantage. For the new scaraboid, lighter material was more often desired, particularly a beautiful blue variety that has more recently been given the French name "sapphirine" (Boardman, 1968).

In the third century B.C., Alexander the Great expanded the Greek empire into the gem-rich Eastern countries. The result was a flood of new gem materials into Greece and later into Rome. Garnets, amethyst, topaz, beryl, agates, and other stones were now also available for engraving (Boardman, 1968). Amethyst and garnet became particular favorites and were often used for the finer pieces. Interestingly, glass was also highly valued (Boardman and Vollenweider, 1978).

The Hellenistic period, which spanned the

years between the death of Alexander the Great (323 B.C.) and the conquest of Greece by the Romans (146–39 B.C.), produced several important innovations with regard to the glyptic arts. The first of these was the evolution of the scaraboid into the ringstone. With the ringstone, the seal was mounted so that the engraving showed at all times and was fixed in its setting (figure 6). The finger ring was soon widely adopted as the ideal mounting for personal signets. Equally important was the acquisition of the diamond point (i.e., minute splinters of crushed diamond mounted in an iron tool) from India (King, 1885). Possessing a hard, sharp edge, this tool was ideally suited to engraving the fine lines needed to realistically represent hair and the delicate folds of clothing so admired by the objective eye of the Hellenistic Greeks and later the Romans (Richter, 1968).

The Hellenistic period also marked the first appearance of the modern cameo. During and immediately following the reign of Alexander the Great, the practice of using a portrait as a seal was started. With the introduction of banded chalcedonies, such as sardonyx, into Greece from its conquered territories, an engraving form that was distinctly suited to portraiture—the cameo—evolved. Cameos were usually composed of two layers, a light upper layer against a darker background (figure 7), but complex pieces occasionally utilized as many as four layers of color. The earliest documented example of a true cameo—the heads of Demetrius Soter and his wife Laodice (162–150 B.C.)—was carved in three layers of sardonyx on a surface that measured only $1\frac{1}{4} \times 1$ inch (King, 1885). Although the cameo had evolved from the scarab and scaraboid, which had important utilitarian functions, this form of engraving in relief was for decorative purposes only. Usually,

Figure 4. The highly symbolic scarab beetle served as the model for the scarab seal that was commonly employed by the ancient Egyptians and was eventually adopted by other cultures.

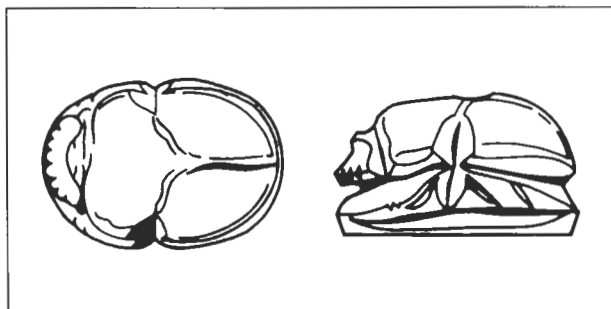
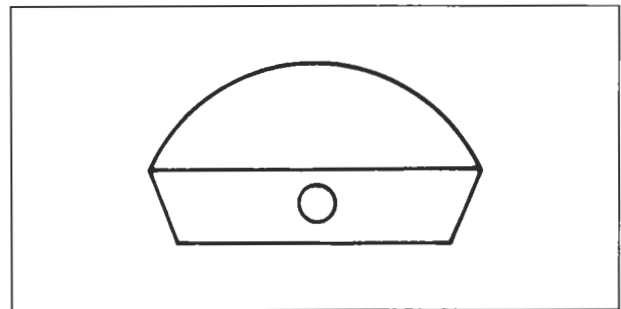


Figure 5. The simple lines of the scaraboid seal were preferred by the ancient Greeks.



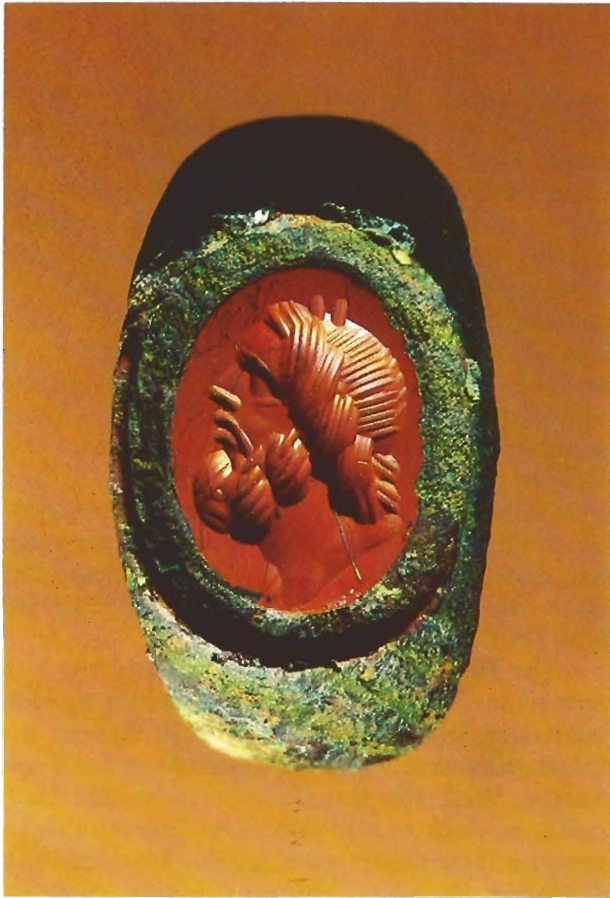


Figure 6. This Roman seal from the third century A.D. features the head of Jupiter engraved in jasper. As was the popular style during this period, the seal was mounted in a brass ring. Photo and ring courtesy of Michael Stubin.

cameos were set in jewelry, especially rings and pendants.

The Roman conquerors greatly admired anything Greek, and engraved gems were no exception. The earlier Italians, the Etruscans, used the Greek scarab almost exclusively for their seals (Boardman and Vollenweider, 1978). The later Romans replaced the scarab with the ringstone and the signet ring; they also adopted the cameo. Although they did not improve on these models, they did increase the variety of subjects. While they continued to use the Greek gods in their designs (figure 8), the Romans added their own gods, along with such subjects as chariot races, erotic poses, whimsical animals, and many other imaginative creatures and scenes.

The Romans not only were prolific producers of engraved gems, they were also enthusiastic collectors of the engraved gems of other cultures, particularly those of Greek origin. As they re-



Figure 7. A Roman cameo dating to the first century B.C. or the first century A.D. made from chalcedony (9 × 10 mm). The subject is an almost whimsical rendition of a gorgon. Note that the detail has been engraved into the white layer of the stone, with the darker layer serving as background. Stone courtesy of Michael Stubin; photo by Mike Havstad.

turned victorious from their military campaigns, the commanders would parade their spoils through the streets of Rome. These displays fueled an ostentation for jewelry. "Unless you are strewn with gems, don't even hope to pass for a wealthy man," wrote Manilius, a Roman poet (Ball, 1950). "Gems" and "engraved gems" were virtually synonymous, since the great majority of gems perceived to be of value were those that were engraved. Many gems were placed in temples as offerings to the gods and as a display of the Romans' wealth. Julius Caesar dedicated six cabinets of gems in the Temple of Venus Genetrix and Marcellus, thereby creating what some experts feel were the first public museums (Boardman, 1968b).

The Mediterranean area is poor in gem deposits. Much of the early material, which was mostly varieties of chalcedony, was picked up by itinerant peddlers traveling in the desert regions. Egypt was probably the best early source, drawing on their turquoise and, more rarely, their emerald and peridot deposits. But with the conquest of the Eastern territories, particularly India, by Alexander the Great and the later Roman military commanders, a great profusion of new species and varieties of gems arrived into the classical world. Although carnelian and sard continued to be used predominantly for engraved seals (1300 out of 2600 classical gems in the British Museum are composed of these two varieties of chalcedony),

almandine, rhodolite, and hessonite garnet, amethyst, rock crystal, sapphire, bloodstone, jasper, turquoise, and many other gem materials were also used for intaglios (see figure 9 and cover). Emerald from Egypt, Scythia, and possibly the Urals was much appreciated but only occasionally engraved because of its rarity and fragility. Nevertheless, both Alexander the Great and Cleopatra favored emerald for their engraved portraits (Ball, 1950).

After the Fall of Rome. With the dismantling of the Roman empire, so ended the greatest era for the glyptic arts. By the close of the fifth century, gem engraving had virtually passed into extinction (Sutherland, 1965). The Middle Ages contributed little; the few stones that were engraved were crudely cut with bold designs that lacked any subtlety. To satisfy the need for seals, ancient gems were often remounted in rings with the name of the bearer carved in the metal surrounding the

Figure 8. A Roman intaglio of banded carnelian engraved to represent Athena, the Greek goddess of wisdom, holding a shield and spear. This ringstone (which measures 12 × 15 mm) was engraved in the first century B.C. Photo and seal courtesy of Michael Stubin.



intaglio. For example, after Charlemagne was crowned heir to the Caesars by the Pope in 800 A.D., he made the portrait of the pagan Emperor Marcus Aurelius Antoninus (88–217 A.D.) his seal. The pagan motifs were reinvested with new Christian symbolism, effectively sidestepping an obvious incongruity. Every veiled Roman lady became a Mary Magdalene in the eyes of the Christian wearer; Jupiter was renamed St. John the Evangelist (Sutherland, 1965).

The average citizen of Western Europe apparently knew and cared little about engraved gems as seals. Rather, the gems seemed to assume greatest significance for their purported magical and medicinal powers. For example, the figure of a man holding a palm branch in his hand, cut in jasper, was determined to render the wearer "powerful and acceptable to princes;" the engraving of a horse on any stone was indicated as a cure for lunacy; and a lion engraved in garnet would bring riches and honor. The wearer of an Aquarius carved in green turquoise was assured good luck in all buying and selling, "so that buyers shall seek him" (Sutherland, 1965). King (1885) cites 42 such associations. In fact, a common belief during this period was that the stones were not carved by man, but rather were engraved by some force of nature: man could not have cut such hard material (Anderson, 1981). Although seals continued to be used

Figure 9. This engraving of a sow has been made on a piece of green quartz, one of the more unusual gem materials used by the Romans. This 10 × 12.5 mm piece has been dated to the latter half of the first century A.D. Photo and seal courtesy of Michael Stubin.



regularly, most of those newly fashioned were made from metal rather than stone. With the exception of the few vestiges of Western civilization that remained to preserve knowledge of gem engraving in some fashion—particularly Alexandria and Byzantium—the art almost vanished.

A Renaissance. With the passage of time and the increasing civilization of Europe, especially the broadening of trade and barter, a renewed interest in engraved gems developed. By the 14th century, a revival of stone engraving was apparent, especially in Italy. Personal seals, displaying heraldic designs and Christian motifs in a Gothic style, predominated. These were soon followed in the 15th century by gems engraved with classical subjects. A renewed interest in anything antique by such important personages as the Medici increased the popularity of this art form (Morassi, 1964). During this age of personal patronage of art, artisans were encouraged by the various noble houses and to some extent the papacy (particularly Pope Paul II, 1417–1471) to enhance their own skills and teach others. Cameos were especially popular during the 15th and 16th centuries, since they were much more conducive to lavish display in jewelry and as *objets d'art* than the delicate intaglio. Also during the Renaissance period, with the influx of fine stones—rubies, emeralds, diamonds, and the like—the art of faceting gems to provide the brilliance and life that made them highly attractive in their own right developed. Gradually, artisans began to specialize in either the glyptic arts or gem cutting (Sutherland, 1965). The concepts of gem and engraved gem were no longer inseparable.

An important factor in the renewed popularity of cameos and other engraved gems throughout the 16th and 17th centuries was the discovery of large deposits of carnelian and agate in the Idar-Oberstein region of Germany. In conjunction with these important deposits, the famous lapidary community of Idar-Oberstein was created and nurtured.

Although the renaissance in the glyptic arts was based on classical designs, the ancient pieces themselves were not directly copied until the 18th century, during another resurgence of interest in all things classical. Napoleon Bonaparte was partially responsible for this neoclassical revival. He was especially fascinated by engraved gems and even founded a school for gem engraving. He acquired a great many important pieces as part of the plunder from his conquests. The Vatican was one

of the reluctant contributors to Napoleon's collection, as this holy seat possessed an important collection based on an inheritance from King Louis XV of France (Hinks, 1975). Eventually, every self-styled intellectual, which included much of the royalty in Europe and others of note, shared Napoleon's fascination with ancient engraved gems and sought to establish their own collections. But there was just not enough supply to satisfy the demand. Fake antiques were created in great quantities to fill this gap. This prompted the observation by C.W. King (1860) that "For every antique gem of note, fully a dozen of its counterfeits are now in circulation, and often so close is the imitation as to throw doubt upon the authenticity of the original itself."

The downfall that resulted was inevitable. The leading character in this drama was Prince Poniatowski, who had inherited from his uncle, the last king of Poland, an important collection of 154 antique engraved gems that he subsequently expanded to approximately three thousand pieces. Following the prince's death in 1839, his collection was auctioned by Sotheby's in an event that drew buyers from all over the world. Shortly after the sale, however, word began to spread that most of these gems were not antique, but rather were contemporary pieces created by Italian craftsmen following antique designs. The embarrassed collectors who had purchased the gems suddenly felt themselves vulnerable, painfully aware of their general inability to safely tell the age of engraved gems.

In the wake of this scandal, the passion for collecting antique engraved gems almost died. To this day, interest in this specialized field remains at levels far below those of the 18th and 19th centuries, despite the increased expertise in dating such pieces. Even the utilitarian value of seals was diminished by the invention of the gum-sealed envelope and the development of the modern postal system during the 1800s.

Although many important collectors left the field and engraved seals lost the status of a major art form, the rising middle class of the nineteenth century adopted engraved gems for a different purpose—in jewelry, particularly cameos. Several factors are responsible for the renewed popularity of cameos. Large deposits of agate were discovered in Brazil, which replaced the now-depleted German resources. This new agate was also well suited for dyeing by newly discovered or rediscovered processes, thereby greatly increasing the



Figure 10. This 19th century chalcedony cameo (85 mm wide \times 59 mm high) is an excellent example of the fine workmanship that could be found particularly early in this period. Like many of the pieces created during and after the Renaissance, this too carries a classical theme, "Death of Adonis." Signed "Dreher," from a private collection. Photo ©1983 Harold and Erica Van Pelt.

supply of raw material available for engraving. Although skilled artists could be found throughout Europe, Idar-Oberstein became the center for this new production of brightly colored agate cameos.

The rediscovery of shell, which was ideal for mass production because of the ease with which it could be carved and the predictability of the layering, also increased the availability of cameos. Italian artisans were already skilled at carving the local coral and lava, and their tools and techniques worked equally well on shell. Italy then as now became the center for carving cameos out of shell. The fact that England's Queen Victoria was a great patron of shell cameos assured a steady demand for many years.

But while many fine cameos were created (see figure 10), particularly during the earlier period of Victoria's reign, the mass production stimulated by increased demand eventually led to poor workmanship. Less experienced craftsmen were

often allowed to do most of the work on these cameos, the skilled artisan only adding the finishing touches. By the end of the 19th century, much of the interest in cameos had subsided as well.

THE CURRENT STATUS OF ENGRAVED GEMS

Engraved seals, while still popular in many Eastern nations, are little used in the modern Western world. However, interest in other forms of engraved gems has been generated by a growing pool of skilled artisans, the introduction of more sophisticated techniques, and the extension of engraving to larger objects and more unusual materials. Idar-Oberstein, in particular, has led the way both in providing the in-depth training required to master this difficult art form and in taking the art form beyond the classical styles to experiment with new designs (figure 11). In an attempt to revive the area's gem-cutting industry



Figure 11. Richard Hahn, one of the most important carvers in Idar-Oberstein today, represents the many skilled artisans who are currently expanding the scope of gem engraving.

after World War II, many of Idar-Oberstein's carvers turned their attention to engraving large surfaces such as bowls, chalices, and plaques. While chalcedony remained the favored material for most of these pieces and the traditional cameos, other forms of quartz, tourmaline, and the like have been used as well to demonstrate the versatility of the engraver's art (figure 12).

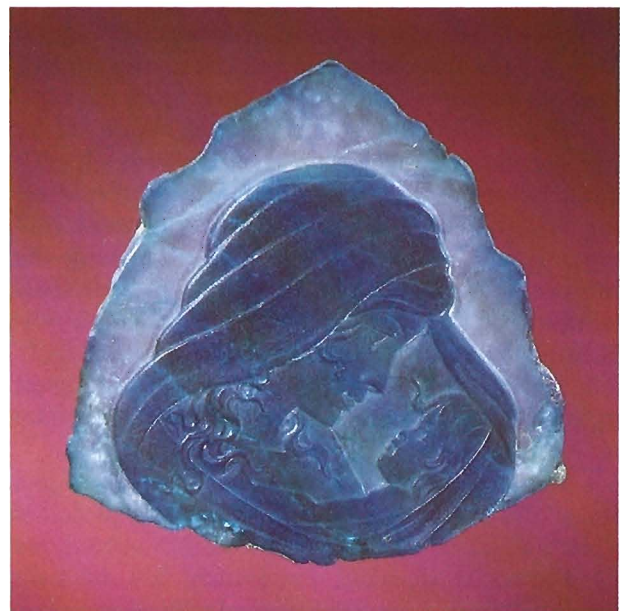
Recently, a challenge to the position of hand engraving has appeared—that of ultrasonic engraving. Using ultrasonic drills, technicians can mass produce cameos and intaglios in hard stone such as chalcedony at a much faster rate than by the traditional methods. Whereas a medium-size cameo may take up to a day to complete by hand, these new techniques can shorten the time needed to less than one hour. This is accomplished by constructing a steel cameo in positive from a hand-carved cameo. From this steel positive numerous copper negatives are made; each copper negative has the ability to make one hard stone cameo by guiding the ultrasonic drills. The results are virtually identical to the original model (Manfred Wild, personal communication).

EVALUATING ENGRAVED STONES

Evaluating gem engraving is very much like evaluating any art form. Foremost in criteria is the overall design. The observer should judge whether the subjects shown are in proportion to one another and to the small field of the gem. The skillful depiction of depth and dimension is another con-

sideration. Fine detailing and variation in surface finishes, such as a matte texture for clothing and a glossy finish for skin, create an illusion of depth that is almost three-dimensional. The piece

Figure 12. Tourmaline is one of the newer materials used for gem engraving. This scene was engraved on the blue cap of a tourmaline crystal from the Queen Mine in California (note the natural crystal edge). Cameo (7 cm × 7 cm) courtesy of Gerhard Becker; photo ©1980 Harold and Erica Van Pelt.



should also be free of accidental tool marks, which detract from the central theme or figure (Sinkankas, 1968).

While most intaglios are constructed from evenly colored stones, cameos are usually made from layered materials. The cameo artist painstakingly selects chalcedony with good contrast between layers. This task is not an easy one, and takes up much of the time of the engraver. Cassis shell provides no such selection problem, as it is consistently banded with strongly contrasting layers. Whatever substance is used, the more layers incorporated into the design, the more complex the piece is and thus the more desirable it becomes. It is also axiomatic that the harder materials are more difficult to carve, and so are more expensive to produce. Because of this, engraved beryl or corundum is highly prized.

Today's collector of engraved gems faces formidable, but not unsurmountable, challenges. A cultivated eye is developed from a study of the literature relating to gem engraving and from a more than passive contact with actual pieces. The first requirement, that of reading about the subject, is not an easy one. As interest in this field goes in cycles, so does the volume of literature. The most complete studies of engraved gems were made in the 19th and early 20th centuries. Unfortunately, most of these suffer from much misinformation, are written in German or French, and are now out of print. Fortunately, more contemporary writers/scholars such as Boardman, Vollenweider, and Richter have made excellent, if sometime esoteric, studies in English.

The most satisfying education, however, comes from actual observation. There are several excellent museum collections in the United States and Europe, including the Boston Museum of Fine Arts, the Metropolitan Museum of Art (in New York), the J. Paul Getty Museum (Malibu, California), the Oriental Institute (Philadelphia), the Burton Y. Berry Collection at the Indiana University Museum, the British Museum (London), and the Louvre and Bibliothèque Nationale (Paris). Excellent examples of more modern pieces can be found in the Deutsches Edelsteinmuseum in Idar-Oberstein, Germany. Dealers who specialize in estate jewelry also often have cameos and intaglios of all periods.

CONCLUSION

The engraving of gems for use as seals, or as objects of adornment, is one of the oldest of man's art

forms. Because of the hardness of most of the materials used, many engraved gems have endured through thousands of years of recorded history, and survived as glimpses of civilizations of which few other tangible vestiges remain. Their lasting charm has kept interest in engraved gems alive through cultures down to our own.

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