FACETING LARGE GEMSTONES

By Michael Gray

The quest for the largest permeates all societies and disciplines. With the advent of new machinery and techniques, size records for faceted gemstones are falling constantly. Currently, a 22,898-ct yellow topaz holds the record for weight and a 19,548-ct citrine holds the record for size. This article discusses some of the more important gemstone giants, and describes the specialized equipment and techniques developed to cut and polish them.

ABOUT THE AUTHOR

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Since earliest history, the maxim "bigger is better" has held almost universal sway. Whether it is the longest automobile, the tallest building, or the largest airplane, the human animal is caught up in the frenzy of always reaching to expand our limits. Such is the case with the fashioning of gemstones.

As an example, at the heart of the Crown Jewels of England are the 167-ct Edwardes ruby, the Timur "ruby" (actually a 361-ct red spinel), and the Cullinan I, at 530.20 ct the largest faceted diamond in the world (Arem, 1987). The fashioning of these stones required not only special pieces of rough, but also special equipment and special skills. Yet it is human nature that when presented with a challenge, the individual will rise to meet that challenge.

A new challenge was met over 30 years ago by John Sinkankas, when he first tackled the problem of how to maximize the yield and creative possibilities of various extremely large (some weighed several pounds) pieces of rough beryl, quartz, and topaz. To fashion such large pieces into the sizes and shapes that he desired, Sinkankas determined that he would have to have a special faceting machine built, one that could cut stones that were more easily measured in pounds or kilograms than carats. After studying the attributes of the faceting machines available at the time, Sinkankas decided that the design of the Allen faceting machine (now no longer on the market) would suit his needs best. With the permission of Mr. Gene Allen, he had a faceting machine built with components that were 1.5 times larger than normal, and that could handle cutting and polishing laps with more than twice the working area of normal laps. It is with this machine that Sinkankas fashioned the quartz eggs on his custom-made jeweled stands that are found in major museums today (Sinkankas, 1984). The largest of these magnificent faceted eggs, at 7,000 ct, is located in the Smithsonian Institution, Washington, DC. Other gemstones cut by Sinkankas on

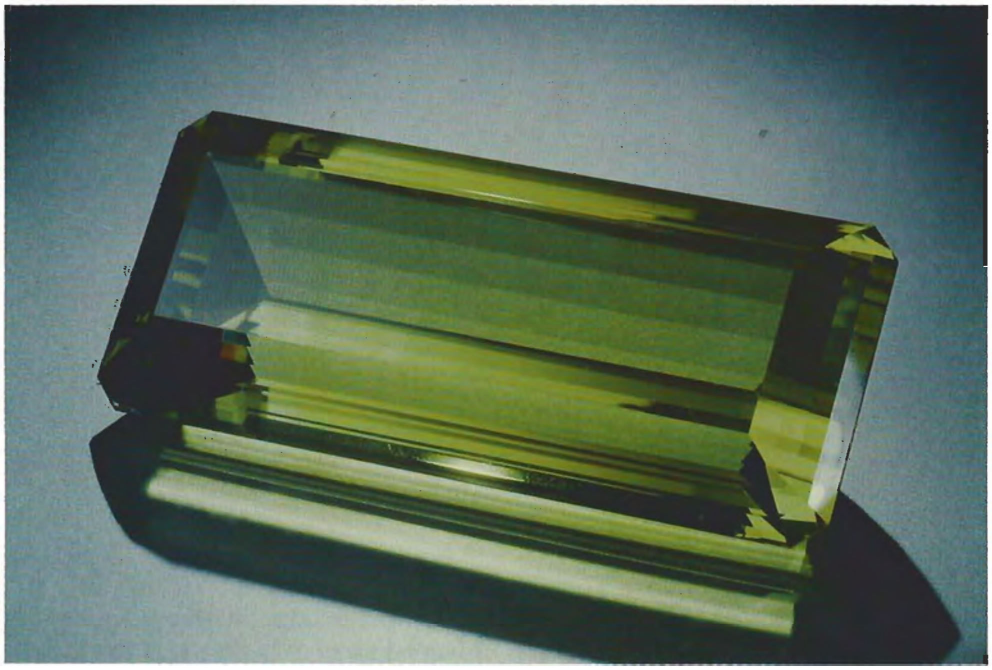

Figure 1. John Sinkankas cut this 2,054-ct green-gold beryl (12 × 5 cm) in the early 1960s on a special machine he designed based on the Allen faceting machine. Courtesy of the Smithsonian Institution.

this machine in the early 1960s include a 2,054-ct green-gold beryl (figure 1) and a 3,273-ct light blue topaz, both also in the Smithsonian, as well as an 1,800-ct greenish yellow spodumene that is currently in the Royal Ontario Museum in Toronto, Ontario.

In the mid-1970s, another milestone was reached when gem and mineral dealer Edward Swoboda commissioned Elvis "Buz" Gray to fashion the largest stone possible from a 90-lb. (41 kg) crystal of natural-color blue topaz that he had brought from Brazil in the 1950s. The machine used to facet the stone was based on the one developed by John Sinkankas, which had previously held the record for cutting the largest faceted stone, the 7,000-ct quartz egg mentioned above. Various technological improvements were made on the design of the machine, such as adding calibrations for accuracy, incorporating cheaters to provide greater flexibility in adjusting the stone during cutting and polishing, and reinforcing various components so that the machine could hold the 15-lb. preform. The use of diamond-impregnated laps enabled cutting to proceed much faster than it had for Sinkankas 10 years earlier, when the laps had to be charged with diamond powder by hand. By using a vibrating polishing machine, Gray was able to finish the table of the stone without giving it constant attention. Even with these new cutting and polishing advantages, though, it took "Buz" Gray over two months in 1976 to complete this 21,005-ct square cushion-cut stone, christened the Brazilian Princess, which is now on display at the American Museum of Natural History in New York (figure 2).

Figure 2. The Brazilian Princess, at 21,005 ct (14.3 × 14.3 × 12.7 cm), is the largest faceted natural-color blue topaz in the world. Cut by Elvis "Buz" Gray, it took over two months to complete. Stone courtesy of the American Museum of Natural History; photo © Harold & Erica Van Pelt.

Since then, other cutters have sought to push the limits even higher, although they are hampered by the lack of large gem-quality rough and by the expense of the specialized machinery, as well as by

Figure 3. This 19,548-ct (25.5 × 14.1 × 10 cm) citrine, cut by the author, is the largest (in volume) faceted stone in existence. Photo © Tino Hammid.

the time involved to complete these behemoths. In the past couple of years, though, several significant stones have been faceted. In 1987 alone, Richard Homer of GIA cut a 20,769-ct irradiated blue topaz (see Christie, 1987); Leon Agee cut the heaviest faceted stone on record, a 22,892-ct yellow topaz (J. White, pers. comm., 1988); and the author cut the largest stone on record, a citrine that is 20% larger (in volume) than Agee's stone but, because of the lower specific gravity of quartz, weighs in at just 19,548 ct (see Thompson, 1987; figure 3). Table 1 lists the largest stones (over 1,000 ct) faceted to date, to the author's knowledge. The green beryl, the Brazilian Princess, the citrine, the blue fluorite, the kunzite, and the yellow spodumene are illustrated in figures 1–6.

Cutters do not facet large stones, especially the giants, to make a lot of money. In almost every case, a cutter could make much more by cutting up the rough into jewelry-size stones and selling them

Figure 4. Fluorite can cause special problems during faceting because of its softness. Art Grant cut this 3,969-ct (8-cm square) blue fluorite, the largest of its kind. Photo © Tino Hammid.

Figure 5. Kunzite in a size and quality to yield a large cut stone is very uncommon. This 1,267-ct (7 × 5.4 × 3.7 cm) kunzite is a rare specimen indeed. The brass dopsticks shown here are of the type used to facet large stones. The V-shaped dopstick attaches to the pavilion; the flat dopstick attaches to the table. The silver "dop-chuck" serves to convert normal dopsticks for use on the larger faceting machines required for large stones. Courtesy of the Los Angeles County Museum of Natural History; photo by Dick Meier.

in quantity. The same holds true when he or she facets stones for someone else. In many cases, the cutter is lucky to make expenses when fashioning such large pieces, considering the costs of the equipment and materials, the enormous amounts of time involved in the cutting, as well as the limited market for the stone once it is completed. However, the challenge of the task and the prestige of the accomplishment prods the cutter on—the desire to be able to cut any size stone.

While extremely large stones are not suitable for use in jewelry, they do serve several purposes. First, these stones help educate the public. Since large stones are enlarged versions of stones that can be worn, they demonstrate the function that the facets play in giving beauty to a stone. They also illustrate just how large some gem materials may occur and can be cut. Large stones are popular exhibits at gem and mineral shows and museums. In the same manner, such stones are used in jewelry store displays not only to help educate the public, but also as a promotional tool to draw customers to the store.

This article examines the fashioning of such large stones using today's technology and equipment, with specific remarks related to the cutting of the author's 19,548-ct citrine (figure 3) since that stone is the largest (in volume) faceted stone at this time, and any problems encountered would be magnified on it. To many faceters, a large stone would probably mean one that would be over 100 ct when cut. However, one can cut stones up to 1,000 ct from topaz, spodumene, fluorite, and calcite, and up to 800 ct from quartz (due to its lower specific gravity), without much difficulty on standard faceting machines and with special attachments being manufactured today. Basic faceting procedures are covered in the excellent manuals written by Sinkankas (1984) and the Vargases (1977). This article covers those areas where the size of the stone dictates modifications in equipment, materials, and techniques. Once one reaches about the 1,000-ct mark, special machinery is needed to facet these remarkable gems.

THE FACETING PROCEDURE

Equipment. Before one can begin to cut a large stone, one needs to have the proper equipment. The requirements for most stones over 1,000 ct include access to 24-in. self-feeding table saws and heavier grinding units for preforming, a special faceting machine that can accommodate 12- to 16-in. cutting and polishing laps, and a lathe for turning the stone over when one half of it is finished.

Preforming. Much time and effort can be saved by preforming any stone before it ever touches a faceting lap, but this is especially true for larger stones. The more one can saw and grind off on

Figure 6. The yellow spodumene shown here, accompanied by a large crystal of the same material, weighs 1,240 ct (9.5 × 5.3 × 4.6 cm). Photo © Harold & Erica Van Pelt.

relatively inexpensive diamond grinding wheels, the less time one must spend grinding away material on more expensive diamond flat laps.

Most heavy-duty preforming can be done with remarkable accuracy on a 24-in. self-feeding table saw, which is commonly available through local gem and mineral clubs or rock shops. The stone should be clearly marked with indelible ink (a Marks-a-Lot pen works well) exactly where it is to be cut and lined up with the saw blade. Remember that the saw cut will be several millimeters wide. The stone should be securely fastened and wedged in place, so that it will not move or wobble; always recheck the alignment after set-up. If the stone is lined up correctly, the self-feeder advances it at a predetermined rate and makes the cut along the marked line. In the case of the big quartz, approximately six hours were needed to line up and saw off all extraneous material; it might have taken several days to grind off the same amount.

Once the stone has taken a preliminary form through sawing, it must be further shaped on a coarse grinding wheel, 80 grit or rougher, mounted in a cabochon-making machine (figure 7). With practice, one will produce a preform that requires very little grinding on the faceting machine and thus will save days of slow lap cutting. On very large stones (those over 5,000 ct) it is often desirable to lap and polish the table of the stone on a vibrating lapping machine, such as a Vibra-Lap or Recipro-Lap before cutting any other facets. It is at this point that there is the smallest surface polish-

TABLE 1. Largest gemstones on record for those materials from which single stones over 1,000 ct can be faceted.[a]

Species and variety	Weight (ct)	Cutter	Current location
Quartz			
Citrine[b]	19,548	M. Gray	Private collection
Smoky	8,580	J. Johnston	GIA
Crystal	7,500	M. Gray	Private collection
Topaz			
Yellow	22,892	L. Agee	Smithsonian Institute (destined)
Natural blue[b]	21,005	E. Gray	American Museum of Natural History
Irradiated blue	20,769	R. Homer	Private collection
Beryl			
Aquamarine	2,594	J. McLean	Private collection
Green-gold[b]	2,054	J. Sinkankas	Smithsonian Institute
Spodumene			
Greenish yellow	1,800	J. Sinkankas	Royal Ontario Museum
Kunzite[b]	1,267	Unknown	Los Angeles County Museum of Natural History
Yellow[b]	1,240	M. Gray	Private collection
Fluorite			
Blue[b]	3,969	A. Grant	Private collection
Yellow	1,032	M. Gray	Los Angeles County Museum of Natural History
Calcite			
Twinned	1,800	A. Grant	New York State Museum

[a]Based on research by Michael and Patricia Gray.
[b]Photo appears in this article.

ing area in relation to the greatest weight on the stone to help hold it down flat. Also at this point, there are no polished facets, which would be susceptible to damage while the stone is on the machine. Even a dopstick (the rod that attaches the stone to the faceting machine) can throw the stone off-balance during cutting and polishing of the table. It is necessary to follow closely all the grinding and polishing steps recommended in the instructions that come with the machine to get the flattest table, and thus the best polish possible. Any rounding that occurs along the edge of the polished table will be cut away when the crown facets are ground in. Cutting and polishing the table may take as long as a week if one starts with a fairly flat, even table surface, but it is only necessary to check on the progress of the stone once or twice a day (figure 8).

Dopping. Large stones do not lend themselves to the normal hot-wax dopping procedure. It is difficult to heat the stone uniformly to a high enough temperature to get the wax to seal, and heating a stone unevenly may cause even non–heat sensitive materials, such as topaz or quartz, to fracture. Furthermore, when the wax hardens, it becomes brittle and may crack, separating the dop from the stone. Another worry is that the hard wax will not hold up to the rigors or the pressure necessary during cutting and polishing.

Most contemporary large-stone cutters use cold-dopping procedures (A. Grant and J. Bradshaw, pers. comm., 1988), since epoxy is much easier to work with than dopping wax, does not require heating the stone, and is readily available in any hardware store. The epoxy is not applied between the stone and the dop; rather, the stone is held to the dop with a material such as modeling clay, and the epoxy is then applied over the connecting end of the dopstick onto the stone, covering the holding material in the process. Care must be taken not to seal the dopstick directly onto the stone, since epoxy dissolvers cannot easily penetrate the thin film that joins the dopstick to the gem. Should this happen, the cutter would have to saw through the dopstick, ruining the polished facets or table in the process, as well as the dopstick.

Even the brand of epoxy can make a difference: Through trial and error, many cutters have found that Devcon epoxies are among the most reliable (A. Grant and J. Bradshaw, pers. comm., 1987). In large stones, since the tensile and shear strength of

Figure 7. After the stone has been sawed, it is preformed on a coarse grinding wheel that has been mounted in a cabochon-making machine. Here, a calcite is being rough ground prior to dopping. Photo by Robert Weldon.

Five-Minute and the longer-drying Two-Ton epoxy is essentially the same, the choice between them is dictated by the specific dopping procedure. On the initial dopping to the table of the large citrine, Two-Ton epoxy was chosen because it is slightly more durable, is water-resistant, and the drying time required, about 30 minutes, is of little consequence. When the stone was transferred to another dopstick (the operation of turning the stone over), Five-Minute epoxy was used because it doesn't flow as fast and it hardens more quickly, making it easier to apply for this purpose. Through experience, however, it has been found that in the large quantities used for large stones, Five-Minute epoxy does not seem to harden as well as Two-Ton epoxy, and it is not completely water-resistant. These factors do not play as big a part once the stone has been transferred, though, as most of the strain of cutting will have already been experienced. One advantage of the quicker drying epoxy for the large citrine was that when the stone was finished, it was possible to cut through the epoxy with a red-hot knifeblade to remove the dopstick from the stone. The remaining epoxy was then removed by soaking the stone in Attack, an epoxy remover available through jewelry supply houses. By removing the dopstick from the stone first, the cutter both reduces the time needed to remove the epoxy (from several days to overnight) and decreases the amount of epoxy remover needed to soak off the dop. As with any chemical, and epoxy removers are more dangerous than most, be sure that all label instructions are followed to the letter, and that contact with the chemical is avoided as much as possible.

Transferring the stone between dopsticks is accomplished the same way as for jewelry-size stones, that is, on a transfer block. In the case of a large stone, however, the transfer block takes the much larger form of a lathe, which is usually used for turning woods or metals into items such as chair legs or bolts. A lathe provides a very accurate way to align the stone when turning it over; just make sure that the power is disconnected before the stone is attached. The dopsticks generally have to be custom made to fit the stone, as it is important to seat the stone firmly over a large area for maximum safety while cutting. Again, model-

Figure 8. On large stones, it is advisable to cut and polish the table before any other facets. Here, a Recipro-Lap is used to touch up the table on the large citrine. A waterproof clay-like substance has been placed around the girdle to protect the finished portions. Photo by Robert Weldon.

ing clay is used to hold the dopstick to the stone. Very large stones require two applications of epoxy, one on each side of the stone, as the epoxy runs until it is almost hard, and much attention must be paid to keeping the epoxy on the stone and off the lathe and table. Once the epoxy hardens, the stone (with both dops still attached to it) should be set aside so that the new epoxy can cure thoroughly, usually allowing at least a day for proper set-up. After the new epoxy is cured, the old dop can be removed by cutting through the epoxy with a jewelers' saw (or a hack saw for the really big stones), being careful not to saw into the stone and only to saw up to and completely around the dop, making it easy then to separate the dop from the stone with gentle pressure.

Cutting. On a jewelry-size stone, the lapidary would usually dop the stone and begin grinding on the pavilion or crown. There are several reasons for beginning with the pavilion (once the table is completed) on large stones. First, it is much easier to center the stone during the initial dopping procedure by using the flat surface of the table. What may be a minor misalignment on a small stone is magnified on a large one. For example, what is one to do if the dopstick is affixed to a rough-ground keel-line (or point) and the stone comes out a degree off? This mistake would be very evident at the table of the large stone. Second, the depth of the stone is dictated by the depth of the pavilion; a shallow pavilion can be corrected more easily if the crown has not been finished. The stones being cut should not be windowed, as their large size will make this fault even more obvious than on smaller gems. Third, if the epoxy were to separate from the stone it would be easier to realign the stone on the flat surface of the table than on the rough unfinished pavilion surface.

The time involved in cutting any facet depends on a number of factors. First, the wheels or laps should not be worn to the point that the stone glides on the coolant above the cutting surface even when pressure is applied. Second, the amount of material that is ground off decreases as the facet grows larger, which is due in part to the fact that the amount of pressure that can be applied to any one portion goes down as the pressure is distributed over the larger surface, thus decreasing the amount ground away not just arithmetically, but exponentially.

The actual faceting of the stone is most commonly done by a "peeling" process, in which the facets are ground down a little at a time, around and around the stone until the desired depth is reached. This way the cutter can avoid grinding larger facets than necessary, which get more difficult to cut as the surface area increases. Surprisingly, the stone's weight alone usually is not sufficient to hold the facet onto the lap, as the coolant, oil or water, forms a thin film between the surfaces, in effect causing the stone to "float" over the surface of the lap. The machine must be strong enough so that the cutter can "stand" – that is, put all of his weight – on the stone for long periods of time (figure 9). Literally hundreds of hours of this intense physical exertion were required for the large citrine. With a heavy-duty faceting machine, the stone should not turn in the chuck (the dopstick holder). Extra care is needed on end facets, though, to keep a stone from turning in the chuck.

Typically, the actual cutting of the stone takes place in three steps, each of which requires a different cutting lap (the disc that is impregnated with diamond). The rough (60 or 100 grit) lap is the workhorse, grinding away the excess material and imparting shape to the stone. One does not worry about the absolute alignment of the facets at this stage, just about getting the facets cut in. The stone is next ground on a medium (260 or 360 grit) lap, which takes out the nicks and chips left by the rough lap, as well as any surface flaws that may have appeared during the initial faceting. The final faceting work is done on a fine (1200 or 1500 grit) lap. The cutter takes off very little material with this lap, but it is at this stage that individual facets are lined up and readied for polishing. When aligning the facets, the cutter should take into account the differences in the size of the facets and their different rates of polishing, inasmuch as smaller facets tend to polish more quickly and, therefore, to enlarge slightly as compared with larger facets, especially on softer materials such as calcite and fluorite. Even topaz and quartz display this characteristic, although to a lesser degree.

Polishing. Polishing facets on a large stone can be the most time-consuming step in the process, but this stage may be shortened considerably if a combination of polishing techniques is used.

As with almost any polishing procedure, it is up to the cutter to evaluate the attributes of the various methods available to determine which to use for the stone at hand. For example, a wood lap used with the desired polishing compound will shorten the time required to polish most large facets. This lap, suggested to the author by John Sinkankas, can easily be made from ordinary hardwood plywood found as sheets at lumberyards; it polishes most materials in less than half the time as other laps. However, this same lap usually leaves the facets slightly rounded, and accentuates twinning planes in the material. A second polishing on a harder material, such as on a tin lap, will help flatten out the facets and give an excellent polish. Polishing the stone as a two-step process on a combination of laps requires less time than a single polishing on the better lap because one combines the best properties of the two—in this case, the speed of the wood lap and the fine polish of the tin lap. Wood laps can be used on soft stones (those materials that have a hardness of seven or less on the Mohs scale) as long as the cutter is aware that heat can build up in the stone at the point of polishing, and takes proper precautions to keep the stone from fracturing because of the heat. This can be accomplished by placing the stone on the lap for only a few seconds at a time, and waiting long enough between polishings for the heat to disseminate into the stone. In most cases, however, either a Pellon lap or a wax lap, such as those made by Moyco, can be used to polish such soft stones as calcite and fluorite. One of these laps is also essential for polishing facets situated on a cleavage on harder material, such as topaz or spodumene.

Almost all of the polishing compounds (e.g., both Linde A and B aluminum oxides, cerium oxide, tin oxide, and diamond) can be used on every type of polishing lap, but it is imperative that every effort be made to prevent contamination of the laps by more than one compound at a time and even by simple dust in the air. All laps must be thoroughly cleaned and protected between uses, and wood laps must never be used with a different polishing compound from that which is first introduced to the lap, as the different compounds may have different polishing characteristics. Most materials may be polished with either aluminum oxide or diamond, which tend to give the most consistent results. There are, however, a few notable exceptions. Because of its distinctive structure, quartz cannot be polished with aluminum oxide, so cerium oxide, tin oxide, and/or diamond may be used instead. Since aluminum oxide is synthetic corundum, ruby and sapphire can only be polished by diamond. Although some lapidaries use diamond to polish all stones, it is not necessarily the polishing compound of choice. Diamond powders are more expensive than other compounds, and are messier to work with. Some materials, such as spodumene, actually polish faster with aluminum oxide, but there are other materials, such as topaz, for which diamond is the only practical choice.

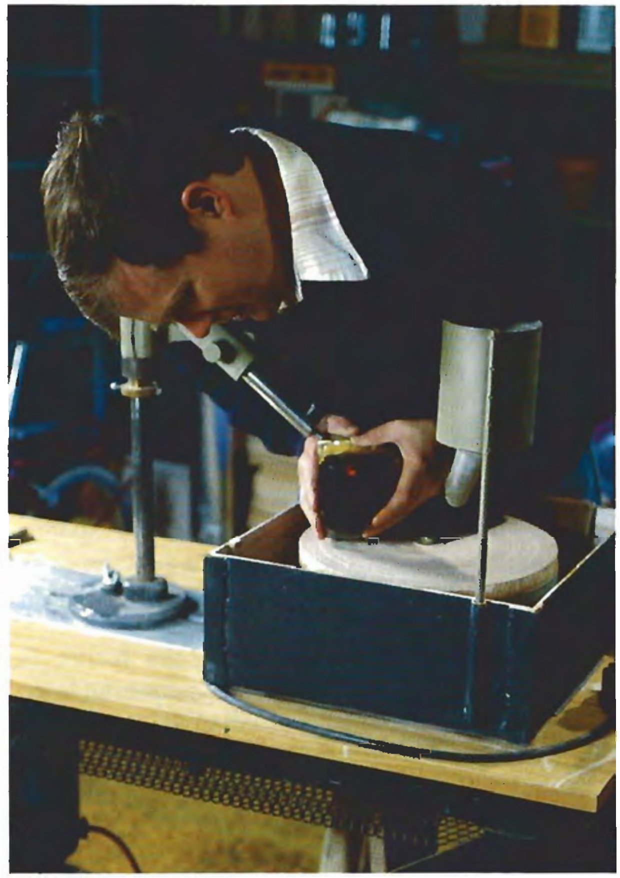

Figure 9. Because the weight of even an extremely large stone is not sufficient to hold the facet on the lap, the cutter can speed the cutting and polishing process by "standing," or putting all of his weight, on each individual facet. On a very large stone, this may require hundreds of hours of intense physical exertion. Photo by Robert Weldon.

Approximately one month was needed to facet and polish the large citrine after completion of the table. The amount of time required will, of course, vary depending on the experience of the cutter.

CONCLUSION

Different lapidaries have different standards and develop different methods to achieve the same ends. It is through this variation in practice that new faceting methods are developed. The lapidary who is cutting a large stone for the first time must use the methods that are most comfortable for him. The author offers the methods in this article only as guidelines, and recommends that the lapidary develop his or her own methods based on personal experience.

The large stones in the photographs accompanying this article are beautiful works of art that can also serve a useful purpose – education. Some day, these stones will be viewed as treasures unto themselves, much like a carving or a painting. Even as our knowledge continues to expand, we are running out of material from which to cut these large stones, relying on erratic new finds now that the plentiful materials that were mined in the past have already been cut up into jewelry-size stones and cannot be replaced. Currently we must rely on new localities, such as Afghanistan for spodumene, and more intensive mining in areas such as Brazil, which has historically produced large crystals of topaz and quartz.

As new materials are found, the future is promising for even greater feats of fashioning large gemstones. The use of lasers in diamond cutting is only a precursor to what may be accomplished by laser technology on large colored stones. New materials and equipment are also being developed to aid in polishing, such as the Spectra Ultra-Lap developed by Moyco Industries, which speeds the polishing of quartz facets up to a certain size. Eventually, better technology in machinery and polishing compounds will result in brighter, crisper large stones. Certainly, this same technology will help in the development of better methods for faceting jewelry-size stones.

REFERENCES

Arem J.E. (1987) *Color Encyclopedia of Gemstones,* 2nd ed. Van Nostrand Reinhold Co., New York.

Christie A. (1987) A very special brilliance. *Lapidary Journal,* Vol. 41, No. 9, pp. 43–46, 62.

Desautels P.E. (1979) *Treasures in the Smithsonian, The Gem Collection.* Smithsonian Institution Press, Washington, DC.

Sinkankas J. (1984) *Gem Cutting, A Lapidary's Manual,* 3rd ed. Van Nostrand Reinhold Co., New York.

Thompson S.E. (1987) A cut above. *Lapidary Reporter Tucson Show Guide,* September 1987, pp. 9, 10, 14.

Vargas G., Vargas M. (1977) *Faceting for Amateurs,* 2nd ed. Glenn and Martha Vargas, Thermal, CA.

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