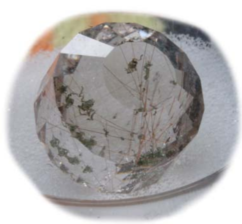
The New Mexico Faceter's Journal 2008

New Mexico Faceters Guild

NMFG
Show and Tell

Three sapphires cut by Nancy Attaway, two filigree pendants made by Steve and Nancy Attaway and a ring set with sapphires by Steve Attaway.



Some fun rough stones, rutilated quartz and spectrolite by Dylan Houtman.

The New Mexico Faceter's Journal

Guild Officers 2007-2008

President: Ernie Hawes
Vice President: vacant
Secretary: vacant
Treasurer: Elaine Weisman
Guild Gemologist: Paul Hlava
Guild Mineralogist: Paul Hlava
Workshop Chairman: Ernie Hawes
Program Chairman: Paul Halva and Nacy Attaway

Newsletter Editors:
Carsten Brandt

Newsletter Production:
Ernie Hawes

Purpose of the Guild: The purpose of the New Mexico Faceters Guild is to bring together persons who are interested in faceting or faceted stones. We promote the art and science of faceting and provide a means of education and improvement in faceting skills. Finally, we provide a means of communication between those persons involved in or interested in faceting as a hobby.

Guild Membership: Dues are $20.00 per calendar year (January through December) for newsletter issues sent by e-mail. Hard copies of newsletter issues sent by US mail are $30. Please see the membership application/renewal form on the last page of the newsletter.

Meetings: The Guild meets now on the second Monday of odd numbered months at 7:00 p.m. at the New Mexico Museum of Natural History, 1801 Mountain Road N.W., Albuquerque, NM. Workshops are generally held in even-numbered months. Date, time, and place are given in newsletter. Also, any change in guild meeting times or dates will be listed in the newsletter.

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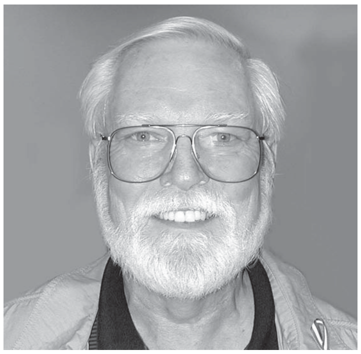
Vol u m e 28 , 2008



NMFG President Ernie Hawes

In This Issue:

New Mexico Faceters Guild Official Website

We invite everyone to visit our website at: www.NMFG.org for interesting and informative articles on gemstones and faceting techniques.

The Prez Sez:
by Ernie Hawes

This year has been an eventful one for the Guild. We had several very informative and interesting programs and workshops. We gained some new members, but sadly lost some. Most notably, our president, Dylan Houtman decided near the end of the year that he could no longer continue his membership and consequently, resigned his office. We owe much to Dylan for his contributions to the Guild over the past several years. He will be sorely missed.

As vice president, I have now moved into the office of president, rather reluctantly, I might add, so if any member is interested in taking on this responsibility, please let me know. The president's term of office doesn't end until January, 2010. Nancy Attaway volunteered herself and Paul Hlava to take on the responsibility for programs until a new vice president is elected (Paul didn't say no). However, I will continue to be responsible for our bi-monthly faceting workshops.

Because of unavoidable difficulties, it has been decided that the Guild newsletter will become an annual publication and renamed "The New Mexico Faceter's Journal". Emphasis will be less on Guild news and events and more on feature articles of interest to faceters everywhere. News and events will still be reported, but mostly as a chronicle of the year's happenings. This issue will be the first in the annual format. Your feedback will be appreciated and will help us to improve on what we publish. Remember, as Guild members, this is your publication. We want it to be an interesting journal that you will look forward to reading. Also, as your publication, we would very much like to have articles written by members.

[Continued on page 4]

In the past, several members contributed very worthwhile articles. Sadly, most of those members are now gone. Since that time, we have gained a number of new members who have not had the opportunity to read the outstanding articles written by folks like Al Huebler, Dick Ochsner, Edna Anthony, and Merrill Murphy. Many of those articles are as applicable to our hobby today as they were when first published. Consequently, we will be re-publishing several of these articles in this and future issues.

Hopefully, now that the election is over, we can have some respite from all the political advertising and regain a bit calm in our lives. The economy does not look like we'll see much improvement for quite awhile. This is bound to affect businesses in the area of gems and jewelry. At least one major supplier has changed hands and it is reported that they will no longer participate in the Tucson shows. It will be interesting to see what happens there next year. Will we still be able to get quality gem rough from South America, Asia and Africa? Will any equipment manufactures go out of business? Only time will tell. And as the Chinese proverb says, "We live in interesting times."

Happy faceting,

Ernie Hawes
President

Contributions From the Past

by Ernie Hawes

In the early years of the New Mexico Faceters Guild there were several members whose individual contributions to the Guild's success were noteworthy. Examples who quickly come to mind were Al Huebler, Dick Oschner, Scott Wilson and Louis Natonek. And there certainly were others. However, one name stands out for contributions that not only benefited the Guild at the time, but endure today in the numerous articles that he wrote about faceting, rock hounding, and the gems and minerals of New Mexico. Merrill Murphy edited ***The New Mexico Faceter*** for many years, and wrote at least one article for virtually every issue during that time. Through those articles, Merrill shared an enormous knowledge of our hobby as well as many years of experience exploring New Mexico's vast landscape.

Merrill was a professional technical writer for Sandia National Laboratories, but he also had a great interest in writing fiction. He sometimes used the *nom de plume* Farwell (Smoky) MacClaren. However, even in his fiction writing, Merrill imparted information that would help us to become better and more knowledgeable faceters, rockhounds, and mineral collectors. Of course, Merrill is no longer with us, having passed away several years ago. New faceters who have joined the Guild in recent years cannot have the experience of knowing Merrill, but they can have the opportunity to benefit from reading some of Merrill's articles. Other readers of ***The New Mexico Facetor*** outside the Guild can benefit as well. Therefore, we're taking this opportunity to reprint just a few of Merrill's more significant articles, partly in memory of Merrill, but also in the hope that you, the reader, will gain some of the knowledge that Merrill shared with us many years ago.

BEAUTY IS ONLY SKIN DEEP - ISN'T IT?

Notes On Faceting

by Farwell (Smoky) MacClaren

Let's assume, for purposes of this article, that you are considering doing a bit of gem repair for jewelry stores in your neighborhood. We could all use a little spare cash. Perhaps you would hoard it toward purchase of a more up-scale faceting machine. Maybe it could be spent on that rough material that makes you salivate just thinking about it. Maybe you'd just blow it on groceries. So, whose business is it why you are considering such a step?

It is your decision, of course, but you should realize what you are getting into. Now, I have three general principles for your guidance if you should decide to repair gems for the local jewelers. Following this trio of admonitions, we set up a couple of actual example stones, describe the problems with each and how the repair was accomplished.

1. - **Size**. A gem's owner (and therefore the jeweler) will not tolerate any perceptible reduction in the wall-to-wall dimensions of the damaged stone he's submitting for repair. If it is a 6 mm stone, perceptible means 0.1 mm or less. On a very large stone you may get away with reducing the dimensions by 0.5 to 1.0 mm.

Did I hear a tortured shriek? Did you cry, "but, that stone - it's all scratched and battered! How can he expect me to remove the damaged surface without reducing the diameter?"

Yes, that is exactly what your customer wants and expects. You perform your magic on every stone you cut. He wants a wee bit of that magic applied to his gem. And very often you can please him. I'll tell you how along toward the end of this little article.

2. - **Original Cutting.** Very few commercial gemstones are cut with any precision. Angles of like facets vary all over the place - so does the indexing. AND, few commercial cutters are even aware of critical angle or the improvement possible by using sets of cutting angles appropriate to the material they are cutting. Most gem cutters live in the Orient and work in sweatshops. Their

machines may be quite primitive, having little or no provision for accurate indexing or angle readout. They are paid by the finished stone or the finished carat weight produced. The greater the diameter (and carat weight) they can get from a given rough, the greater their pay. The trend is slowly swinging toward machines with indexing and angular readout, but the rate of change is slow. The remarkable thing about all this is that so many of these commercial stones really look pretty good - if you don't peer too closely with lenses and such. Read this paragraph again. It really gives you a clue toward making your customer happy.

3. - **When to attempt repair - when to say no.** You do neither the customer nor yourself any favor to accept an impossible job. If his gem has a chip out of the girdle, you can't kiss it with the lap and make it well. Tell him the options. You can gently smooth the chipped place to keep it from hanging on clothing, or you can totally recut his stone to a smaller size. If neither option pleases him, you must politely but firmly decline the job.

Most heavily worn gems have facet edges roughly worn away. Beneath the worn facets, there may be some internal damage. Explain this to your customer, telling him you can make his stone sparkle again but you won't be able to remove the internal bruises. Most people will be happy with the renewed sparkle. If they say they expect perfection, don't touch the job. You regularly perform magic, but you are not into miracles.

Job Example 1 - The jeweler sent out a diamond-shaped amethyst about 10 mm long by 6 mm wide. The stone was single cut, both pavilion and crown. The table was not flat but cabochoned. Four carved and polished, shallow grooves running from culet to girdle, shown through the table, adding interest. The shape was a regular diamond with obtuse angles on the two side points and very sharp pointed acute angles at the end points. The problem was a girdle chip, about 0.5 mm long ending very near one of those sharp end points.

At first glance nothing about this chip looked promising. Oh, sure, I could grind the chipped girdle facet until the damage was removed, then repolish that girdle. Bad idea! That procedure would (a) make that one of four girdle facets wider than the others and (b) make the girdle facets of unequal length. Yes, I could have recut and repolished the pavilion and crown facet on either side of the wide girdle facet. That would have made all girdle facets again of equal width, would have done nothing about the length distortion, would have made the stone smaller and cut away one carved groove on the pavilion. Hmmm...not good.

I called the jeweler, explaining the problem. He made no response - just stayed on the line in dead silence. Thinking he wouldn't like my only other possibility, I, haltingly, suggested perhaps I could round that damaged girdle tip, using cabochon techniques, to remove the chip while sloping on either side of the girdle to keep its width constant. To my surprise, he said, "go for it." I did, and you know, it looked pretty nice. The stone was only a smidgeon shorter than before, and that sharply rounded end gave it the appearance of having a head and a tail. Best of all, friend jeweler liked the result.

Job Example 2 - I received a standard round brilliant blue topaz with a diameter of eight mm. It had, evidently, been worn nearly constantly for years. The crown was badly abraded, the girdle was less severely abraded, and the pavilion was so coated with hardened soap and grime as to be almost opaque. (That nearly opaque pavilion coating is almost a standard with stones coming to me for repair. Actually, simply removing that coating makes a world of difference to the stone's appearance. Its removal is one long step toward making your customer happy. I don't know why he never does that himself.)

So, I let that stone soak for a few hours in plain old 29-cent rubbing alcohol. Rubbing with a soft cloth wetted in alcohol completed the pavilion cleanup. The pavilion looked like new, so I wax dopped to that tapered surface using a quarter inch cone dop. A simple dopping like that doesn't ensure concentricity, so I placed a large flat dop in one clamp of my transfer block and the dopped stone in the other. Then, I heated both dops with a propane flame. When the wax turned slightly shiny, I pressed the two dops tight together and allowed them to cool. Next step, prepare to recut the crown.

One must, now, locate each facet. There were eight mains, 16 girdle break facets and eight star facets for a total of 32. You can bet your best wig that very few facets are going to be either in the correct index position or at the accepted angles. (These were about normal for stones cut in the Orient). How does one locate each facet? It's not difficult, just slow and painstaking work.

To start, first, look closely at instructions for cutting a standard round brilliant. The mains are the most important facets. Using a 64-index gear, note that the mains are indexed exactly eight gear teeth apart. The angles for crown mains vary from around 37 to 42 degrees, depending on the gem material and the age of your instruction sheet. On most commercially cut colored stones, the mains angle is in the 35 to 39 degrees range. Because these mains will be the most important in the recutting process, I usually set the angle at about 37 degrees as a starting guess. Next, I eye-orient one of the least damaged mains to as near index 32 or 64 as possible and tighten the chuck.

Another thing, my 64-index gear is no longer standard. Using a tiny, triangular jeweler's file, I have carefully filed notches between each pair of standard gear teeth. These new notches are not nearly so deep as the standard ones, but they can be used for not-too-accurate indexing points. I now have an index gear with 128 teeth, half of them somewhat inaccurately placed. I have index 1, index 1 1/2, index 2, 2 1/2 and so on. The inaccuracy of these filed notches doesn't matter. All I need is a repeatable index point from which I can "cheat" right or left to exactly flat on the original facet.

Taking a Murphy suggestion, I use a location-and-cutting Lucite lap lightly coated with TREWAX brand paste wax for wooden floors. I spray charge the slowly turning lap with 1,200-grit diamond - just a couple of short bursts. I lower the stone to the lap, adjusting height until it just touches. I run the special lap at low speed - 25 to 50 rpm and with no more lubricant or coolant than was in the spray diamond. My first "cut" is light pressure for, maybe, 5 seconds. Chances are very great that my first-estimate guesses of both index and angle are wrong but in the ball park. If that is the case, cutting will sound like I'm using sand and gravel on the lap. I look at the facet. That light, brief cut may be difficult to see, partly because it will be pre-polish smooth. I use the lens if necessary. Chances are the cut will be toward the top or bottom of the facet and to the right or left. I make a second estimate adjustment of angle based on how far down or how far up on the facet the cut seems to be. Similarly, I "cheat" left or right (or even move a notch or more) as necessary to get dead center of that facet. Then, I make another short trial cut. I may have to repeat the adjustment process several times before I am exactly on that first main. Record angle and index (with cheater setting) and proceed to the next main facet.

I repeat the locating process until each main facet is firmly nailed down. Then, I do the same thing with the girdle break facets. Again, do not be surprised if the locations vary by degrees and index notches. I find that I do not need to "locate" the angular settings for the star facets of a standard round brilliant. I usually select a set of star locations that will place facets about half way between adjacent mains. The angular setting will be lower than the original and will cut into the table a bit. An angular setting of 20 to 21 degrees usually works out to point up the upper tip of the mains. Finally, I'll cut the table down to give me the desired meets at the mains.

The listing below shows the mains angle and index positions I arrived at for that 8 mm blue topaz and matches nothing you will ever cut. It is unique to one stone, one machine, one dopping, one starting point. Cheating, L or R, is similarly unique.

MAINS

39.8 degrees - 32
39.7 - 63 1/2
37.5 - 56R10 - 47 1/2 - 8 1/2
37.0 - 40
41.0 - 24 1/2
39.0 - 16 1/2L25

When recutting actually begins, I start with the mains, using the same Lucite lap and diamond charge I used in the facet locating process. But, now comes the magic trick whereby I recut the crown without seriously reducing the girdle diameter. It is as simple as juggling one ball. I just reduce the angle of the mains by about a half a degree from the angle I found in the paragraphs above. This causes the mains to cut more toward the table. It will remove surface damage up toward the table but do less down toward the girdle. It will end up reducing the table diameter very slightly, too, but the customer won't care if his stone fits his mounting, glitters and flashes again. I cut no deeper than necessary to remove surface damage. I leave internal damage and deep damage alone. My magic can't go deep unless the customer is willing to accept a stone of smaller diameter.

I cut the girdle break facets no more than 0.2 of a degree less than the "found" angles. The girdle was slightly rough in this example, so it was "smoothed" at 90 degrees, removing almost nothing in the process. The stars are cut just before moving to the table recutting, proceeding as mentioned above, with the emphasis on sharp meets. I cut the table down to meet the upper tips of the Mains. I polished this topaz directly after recutting, using 50,000-grit diamond on a waxed Corian lap. Materials, such as amethyst, may polish better using cerium oxide on an appropriate lap.

That is most of the story but not quite all. There is still the question of price **you** will charge for your services. It is a personal thing, unless and until you find you have serious competition. There are two viewpoints. One goes: I am an artist. I do exceptionally fine work. I will not lower myself to accept any job that will not put $50, $100 or some other figure in my pocket. The opposite viewpoint is: I, too, do good work, but I realize that I am really not an artist. I am just a cutter with a wonderfully better machine and access to more information than that poor Oriental who turns out one acceptable stone after another for a starvation wage. Our "artist" repairs only a few stones. No customer in his right mind will shell out $50 or more for repairing a gem which is worth $10, new. Friend artist effectively screens out these lesser jobs. Our "technician" charges on a sliding scale based on the real worth of the stone he receives for repair. He repairs everything from synthetic corundum to the real thing with a worth in five figures.

I tend more to the "technician" viewpoint. But it's your business. You must set the rules. If a little old grandmother comes to you with a much-abraded 6 mm zircon that has great sentimental value (to her), you must stick by your own price rules. Once your rules are set, you can make no exceptions. Once you make an exception, the word gets out. Do you throw out a little old grandmother clutching a $5 gem, or do you help her because you understand the sentimental value she places on her gem?

To make more than pocket money from repairing gemstones, you must repair for a number of jewelers. It helps if you can, also, cut cabochons, stones to fit perfectly into channel mountings and resize little sidestones to fit into off-size mountings.

I am never comfortable with repairing gems for individuals outside the jewelry trade. Why? Because insurance is too expensive. I don't have it. I haven't damaged a customer's stone in a bag-full of years, but I might damage one accidentally. I do, occasionally, repair a stone for an individual, proceeding very very carefully. When I repair for a jeweler, I know he has insurance. I make sure he agrees that his insurance also covers me while I am repairing a stone he left with me. You should be aware of the insurance problem and make decisions you can live with.

DIAMONDS, THE MOST COMPLEX GEMSTONES

by Merrill O. Murphy

We have all heard that diamonds are a girl's best friend. I'm sure that is true, but, if it is, why is a dog man's best friend? Diamonds are like that. Once you answer one complex question about their growth and subsequent history, you invite another question.... or a hat full of them. In this article, we shall delve into many of the questions concerning this hardest, most romantic of all gemstones. Beyond that, we shall make some guesses at the probability of diamonds in New Mexico. Let's start with some technical terminology and how diamonds fit into it.

Earth's Crust - The earth's crust is simply that dirt, water and rock that we are familiar with. This crustal region is roughly 30 to 40 miles thick and mainly composed of rock. As we go a mile or more toward the center of the earth, two things become noticeable, the increase of heat and pressure. Everyone knows that the earth grows hotter the farther down we measure (in degrees Centigrade). However, we do not, generally, think of the increase of pressure at depth (measured in kilobars). We accept that extreme heat may even melt rock, but we seldom consider that extreme pressure is a larger factor in making the rock plastic or even molten.

Plate Tectonics - The theory of Plate Tectonics, now almost universally accepted, states that much of the earth's crust is made up of huge solid rock plates that slowly move in various directions, carrying continents, inexorably, but infinitely slowly, with them. Unbelievable kinetic energy is stored in these plates and expressed mathematically as a function of mass times velocity. When plates collide, part of this energy is released in the buckling of the upper crust, the rise of mountain ranges and volcanic action. The collision of plates does not stop the plate movements. The plates are simply too massive to be halted. Instead, one plate dives beneath the other in a process called "subduction." Subduction has the effect of carrying near-surface crust far down into the plastic area beneath the normal crust.

Cratons - Cratons are parts of the earth's crust that have been stable for a very long time. For study and definition, they are divided into three types by age. The oldest are "archons" at over two and one half billion years. "Protons" are next at 1.6 to 2.5 billion years, and last are the "tectons" at 800 million to 1.6 billion years of age. Strangely, nearly all productive diamond mines seem to yield diamonds that were born beneath archons. The birthplace of diamonds found in some less productive mines seems to have been the underside of protons. No diamonds are known to have grown beneath tectons.

Mantle - The earth's mantle is that layer just below the crust. It is plastic to more or less liquid. The huge continental plates float on the mantle, and in the subduction process, sections of plate rock dive into the mantle and become part of it.

Kimberlite and Lamproite - These are rocks of igneous origin that rose as magma from, perhaps, 150 to 250 miles below the earth's surface. They are the only rock types known to carry diamonds of commercial size. Diamonds may be taken directly from these two rocks or extracted from the sediments resulting from their erosion. The term, "kimberlite" was derived from Kimberley, South Africa, near which diamonds were first mined from a distinct pipe of frozen magma. I have no idea of the name derivation of that other diamond carrier, "lamproite."

Most people, who know a little about diamond genesis, tend to think diamonds formed in kimberlite as it started its journey to the surface. Few of them ever heard about lamproite or know that it is the source, in Argyle, Australia, of a lot of diamond. Indeed, the Arkansas diamond site, long thought to be a kimberlite pipe, is now known to be lamproite. Even so, most of the world's diamond output comes from kimberlite or its erosional debris. **But the real truth is that diamonds of commercial value did not form in either mineral. They simply hitchhiked on the kimberlite or lamproite as it headed for the earth's surface.**

However, diamonds were not the only items riding on the kimberlite/lamproite express elevator. There were crystalline minerals called "phenocrysts" that grew from and in the magma. There were "xenocrysts," crystals other than diamonds that formed outside the elevator magma, only to be incorporated into it later and "xenoliths," or chunks of crustal rock ripped out and carried upward in the flow. When we think of magma, we think of terribly hot liquid rock. That doesn't seem to have been the case with kimberlite and lamproite since the walls of the pipes evidence only minor heating effects. Oh, this magma was hot, alright, but nothing like the "heat" of volcano lava. Pressure seems to have been the major rock liquefier and the cause of the swift rise to the surface. (I shall discuss this heat factor later).

I have long known of the greenish to yellowish kimberlite from the African mines, but I had never seen it until Dr. Lueth of the New Mexico Bureau of Mining and Technology, Socorro, New Mexico, showed me a small chunk from the mineral museum there. Their specimen, no more than walnut-size, had freshly broken surfaces. It was a pale lime-green rock with a slight translucency. The surfaces had a texture somewhat like that of freshly broken, coarse sandstone but with crystalline inclusions to 1/8 inch or so. There was one shiny black diamond about 3/16 inch across at one corner of the specimen. Without the inclusions, the chunk would have resembled the green quartzite some amateur lapidaries cut and call aventurine. I would venture a guess that it would take a reasonable cabochon polish. The "yellow earth" variety evidently results from weathering. In other parts of the world, kimberlite may be gray or some shade of brown. I have seen no lamproite but would assume it looks much the same. However, chemical analysis shows distinct differences.

Pipes - Pipe was a term used at the Kimberley, South Africa deposits to describe the cross-sectional shape of the kimberlite extrusion. At the tops, these extrusions looked like huge, round pipes rising out of the earth. In other parts of the world, kimberlites and lamproites exhibit no regular shape at the tops. Even so, the term "pipe" persists. Viewed from the side, any of these pipes would have the shape of a mammoth carrot, with a "root" or "roots," a midsection called the "diatreme" and a "crater" at the surface. The high-pressure magmas probably followed rock fractures on the way to the surface. There may be a single pipe in an area or, as is often the case, a cluster of them.

Rate of Rise - Kimberlites and lamproites must have risen to the surface at a rather respectable rate of speed. Had that not been the case, any diamonds in these carriers would have reverted to graphite before reaching the surface. Also, the large xenoliths, ripped out by the upward flow, would have fallen back through the flow and never reached the surface. Calculations based on these two facts indicate a velocity of 6 to 20 miles per hour at the point where diamond crystals were scooped out from beneath a craton. At that rate, the diamonds would have surfaced in 4.5 to 15 hours. However, in the last 1.5 to 2 miles of ascent, that velocity must have increased to as much as 65 miles per hour. This increase of velocity can be attributed to the ground water content of the crust at these depths. The rather hot kimberlites or lamproites would have converted the water to steam with a resulting explosive movement at the surface. This factor also accounts for the crater noted at the top of all unweathered pipes.

Heat Sources - I have mentioned that kimberlite and lamproite, while made more or less liquid by pressure and heat, were not nearly so hot as volcanic lavas. If they were, they would vaporize or dissolve the diamond crystals rather than just taking them for a ride to the top. Most lavas originate at much less depth than kimberlite or lamproite. The heat source for lavas derives from friction - the result of massive continental plates grinding together in collision. This frictional heat is easily great enough to melt rock into lava at near-surface pressure. On the other hand, kimberlite and lamproite see only the earth's natural heat which increases gradually with depth. Again, pressure is the major cause of liquidity in kimberlite and lamproite.

Eclogite and Peridotite, **the Mothers of Diamond** - Diamond forms in only these two rock types. The reason is not from a strange diamond aversion to other rocks but that eclogite and a particular form of peridotite are available at depths where diamond can grow as a stable crystalline form of carbon. It is believed that subducted basaltic rocks are metamorphosed (changed) into plastic eclogite or peridotite by the pressure and heat found at the upper region of the earth's mantle. Carbon or graphite, always a normal part of the earth's composition, takes the diamond crystal shape as the easiest form in which to exist under those pressure and temperature conditions. As crystals form, they are incorporated into the plastic rock mass.

The stable depth for diamond crystals is about 55 to 125 miles beneath the earth's surface. Lens-shaped regions seem to form beneath the cratons, becoming "holding areas" for eclogite or peridotite at depths between 55 and 93 miles. Any diamonds in these rocks exist unaltered for billions of years. Microscopic bits of eclogite or peridotite are included into the diamond crystals and can be identified under magnification. Those with eclogite inclusions are termed "E-diamonds," while those with peridotite inclusions are called "P-diamonds."

Diamond Associates - Several crystalline minerals grow with diamonds in eclogite and peridotite and are stable at temperatures of 900 to 1,300 degrees C. and pressures between 45 and 60 kilobars. Among these are pyrope garnet, olivine (peridot), chromite, clinopyroxene and orthopyroxene. Being in the same place at the same time as the diamonds, they are always picked up and carried to the surface by a swiftly rising pipe. Some of these "indicator minerals" are almost always present in and around a kimberlite or lamproite pipe. One of these, a low-calcium, high-chromium pyrope, is invariably present if diamonds started the long journey upward. An even larger list of minerals may crystallize directly from the rising kimberlite or lamproite. These minerals, too, will appear at the pipe craters.

Age and Its Measurement - The age determination of diamond-bearing kimberlites and lamproites, as well as that of the contained diamonds, turned out to be the death knell of the theory that held that diamonds formed in either of these rock types. The diamonds, themselves, proved far older than the rocks that carried them. Finally, eclogite and/or peridotite, carried as xenoliths or trapped as microscopic inclusions in the diamond crystals, were of the same age as the diamonds in a given pipe.

One might think that the age of a diamond could be determined by a carbon-14 measurement. After all, a diamond is a nearly pure crystallization of carbon, and all carbon has some of the carbon-14 isotope. And the percentage of carbon-14 is a function of the age of the solid carbon. However, the upper limit of age determination, using the carbon-14 process, is about 10,000 years. Everything connected with diamonds and their growth makes that figure insignificant. Scientists knew all this, of course, and turned their attention to age determination using the half-lives of certain rare radioactive elements. That didn't work directly with diamonds but did with kimberlite, lamproite, eclogite and peridotite. It didn't work with diamond because the percentage of such elements in diamond is almost nil.

Scientists, however, never give up. If blocked in one direction, they look for another. The new direction, this time, was toward the pyrope garnets found in association with diamonds and even as microscopic inclusions in diamonds. A garnet in a diamond must have grown at the same time as the diamond enclosing it. Pyrope garnets are known to include radioactive elements. A half-life age measurement made on a pyrope garnet inclusion will match the age of the diamond itself.

Some Age Determination Results - The ages of the various pipes and diamond samples listed below are abstracted from a number of publications.

Mine or Location	Diamond Age	Pipe Age	Pipe Rock	Diamond Inclusions
Orapa, Botswana	0.99 BY	*100 MY	K	E
Premier, S. Af.	1.15 BY	1.1-1.2 BY	K	E
Argyle, Aust.	1.58 BY	1.1-1.2 BY	L	E
Finsch, S. Af.	1.58 BY	*100 MY	K	E
Finsch, S. Af.	*3.3 BY	*100 MY	K	P
Kimberly, S. Af.	*3.3 BY	*100 MY	K	P

In the above listing, * means approximate, E means eclogitic, K means kimberlite, L means lamproite, P means peridotitic, BY means billion years and MY means million years. The Finch Mine, South Africa is listed twice because it includes two pipes featuring diamonds of differing ages. Note the vast difference between the ages of the diamonds and of the pipe material that carried them to the surface.

Not All Pipes Carry Diamonds - As the pipe magmas rise, temperature and pressure may change. If this happens over a sufficient time period, diamonds captured by the magma will be oxidized, dissolved into the pipe material or converted back to graphite. Thus, rate of rise of the pipe material is important. Even more important, the rising pipe magma may not pass through a region where diamonds are being held - a storage area.

The North American Potential - In the past, North America has produced few diamonds. With the large fields in Canada coming on line and the promising smaller field along the Colorado/Wyoming line, there would seem to be great potential for diamond production on this continent. While other continents seem to have developed on groups of cratons, North America has only one major craton with large areas in the archon and proton category. Diamond scientists view this situation as indicating a likelihood of more diamond discoveries on our home continent.

The exciting new find on the Colorado/Wyoming border would seem to be on the edge of an archon. New Mexico would be on a proton. This later location would make our state a less likely area for diamond exploration but would not close the gates on the possibility of a find. And there are a number of kimberlite pipes and at least one lamproite pipe in New Mexico. The diamond possibility is primarily in the western part of the state and extends into Arizona, Utah and southern Colorado.

The following areas are believed to contain pipes: Potrillo Mar (west of El Paso, Texas), Dog Canyon (this location may be near Carlsbad or to the west near Alamogordo), Raton (this one almost in the city limits), Maxwell (south of Raton), Red Mesa (?), Moses (northeast corner of the state), Buell Park (in Arizona just west of the village of Navajo, NM) and Green Knobs (a few miles east of Navajo). From my own fieldtrips of 30-some years ago, I am also fairly certain of some variety of pipe in the vicinity of the Navajo village of Teec Nos Pos in the northeast corner of Arizona. Of these locations, only the Maxwell location is thought to harbor a lamproite pipe. The others, seemingly, have kimberlite indications.

In addition to the sites mentioned, I have heard of a kimberlite site northwest of San Ysidro and west of the Rio Puerco valley and yet another on the Zuni Reservation to the west. I have no specifics. Further, there is a large peridotite extrusion at Black Bull Peak which is located west of Reserve, NM and about 4.5 airline miles northwest of the Pueblo Creek Forest Campground. This peridotite is probably different but related to the peridotite in which diamonds are known to form. At the least, it might carry garnets and peridot.

SO, Is There Is or Is There Ain't? Diamonds in New Mexico? I do not know. There are old and unsubstantiated reports of a few scattered finds. Quite a long time ago, a large core drill sample was taken at the Buell Park site. They reported finding no diamonds. Was the sample adequate? Probably not. However, a Mr. William L. Mansker, an Albuquerque research geologist who was involved with the Colorado/Wyoming find, told me there were two adverse thoughts on the Buell Park pipe. 1)- The pyrope garnets from that site were not of the low-calcium, high-chromium type but varied widely in chemical makeup. And 2) Some geologists think that pipe (or pipes) rose swiftly to a point below the surface, paused for a time, then rose again. During the wait period part way up, any diamonds being carried would have oxidized, dissolved into the melt or what have you.

Mr. Mansker left me with an appropriate motto: "Searching for diamonds isn't worth the trouble - but, if you find one, be sure to pick it up.

PREPOLISHING GEMS

by Merrill O. Murphy

Almost everyone has heard the old question that goes: If a tree falls in a wilderness in which no living thing with a sense of hearing lives, does that tree falling make a noise? The answer: No, it doesn't. How come? Well, the falling tree causes strong vibrations in the air; noise, however, is the response of a hearing organ and brain to those vibrations.

I have several times mentioned a quick, simple, easy and inexpensive way to get a very good prepolished surface on the gems you cut. Very few, if any, readers have tried my process. I've made the "vibrations," but, perhaps, I've not made enough noise.

Then, there is a biblical quotation that also applies. (I hate to use biblical quotations because I am certainly not of biblical stature, but here goes, any way.) Quotation: A voice crying in the wilderness. Perhaps, I should quit crying and just describe again my simple process. I'll do it after further clarifying the reasons for harping on the importance of a good prepolish.

Why Worry Prepolishing? - Scott Wilson's study of gem polishing, a few years ago, showed microscopic evidence that a faceter must obtain a very smooth surface on his facets before starting the polishing operation. If he has scratches on the facet surfaces, polishing will not remove them before the facet becomes over-cut. Prepolishing is the process that reduces scratch depth to the point that they can be removed by polishing.

I can hear numbers of faceters shouting, "but I do prepolish using a 1,200-grit, 3,000-grit or a 8,000-grit lap. Isn't that good enough?"

My answer is, "not necessarily good enough. Many stones react too readily to the hardness of the lap, excess pressure, stone to lap, excess lap speed and so on. Your 'prepolish' lapping may leave the stone surface a field of tiny pits cut by scratches too deep to be removed by polishing." What to do? What to do? Try my easy process for prepolishing. It's guaranteed cheap and easy - effective, too.

The Wonder Lap - It's a Lucite (Plexiglas) lap, cheap and common. If you can't find one, make one from a scrap of Lucite. One quarter inch thick is all right; 3/8-inch or 1/2-inch is better. You are going to wax it, then apply a spare charge of 1,200-grit diamond. I'll explain these processes in the following paragraphs.

The Wax - A paste wax, lacking in paraffin and greasy solvents, is best. Most important: your wax should contain a high percentage of carnauba, a natural wax imported from Spain or Portugal. Carnauba wax is considerably harder and more durable than most waxes. I use Trewax brand, clear wax for use on most floor surfaces. You can buy it in one-pound cans at almost any good hardware store.

Lap Waxing - Secure your Lucite lap (clean, of course) to your faceting machine. Reduce lap speed to a fairly low level - guess at 50 to 100 RPM. Now, dip a clean cloth into the paste wax, getting a good coating but not great gobs of paste on a 1- to 2-inch surface of cloth. Lightly transfer the wax to the rotating surface of your lap, trying for even application. Wait 2 to 5 minutes before polishing the waxed surface of the spinning lap. Use another clean cloth, applying slightly more finger pressure than during wax application. This should take less than a minute. The idea is to get a very thin, smooth, even waxed surface. In use, you will be surprised at the durability of this waxed surface. It will remain usable for prepolishing several stones of normal size. When you are sure the wax is worn off, wipe the surface clean using a cloth wetted with rubbing alcohol. When the surface has dried, apply another thin layer of wax as before.

Diamond Charging - Either of three procedures are satisfactory. 1) You can use spray diamond on the slowly turning lap. A couple of short bursts are enough; recharge when the prepolishing process slows drastically. 2) You can charge the lap using a commercial paste-in-a-syringe. Place tiny blobs of the diamond paste, sparingly, around the surface of the stopped lap. Rub the paste evenly over the lap, using your finger. 3) You can mix diamond powder with Vaseline - about one carat to three grams of Vaseline. Apply the mix as for the diamond paste. If you have some clean plastic syringes, you can load them with this home-brew diamond mix.

Using Your Wonder Lap - Let's assume, now, that you have smooth-cut a series of facets, finishing with a standard 325-grit lap. Check to make sure of proper facet meets. Now, to prepolishing on your wonder lap: Set the prepolishing lap speed at 50 to 100 RPM and, using a light touch, press a facet to the lap. Depending on the material and the stone size, 2 to 5 seconds of application should be sufficient. Wipe the stone, clean the facet with alcohol on a tissue and observe the results. If your stone is hardness 8 or greater, you will be amazed to see an almost-polished surface. Softer stones will exhibit a lightly frosted surface. Check with a 10x loupe to be sure no scratches of any depth remain. If there are still scratches you do not think will polish out with minimum effort, repeat the prepolishing and look again. Satisfied? Go on to the next facets. Remember, however, this is a mild cutting process and may disturb your facet meets. Use your new lap to adjust the meets, then clean the stone and go on to final polishing.

Odds And Ends Of Thought - This lap seems to generate very little heat until the lubricant (in the paste or spray) wears out. You will know when the lubricant is getting low because very little debris will remain at the edge of a facet after a prepolishing pass. At this time, it is wise to add a drop or two of diamond "extender" fluid. Spread it evenly on the lap using a fingertip. Extender fluids are offered under several brand names and are available from any lapidary supply house.

I am not 100% sure why this prepolishing lap works so well and so easily. Instead of abrading the facet surface, it seems to plane it (as in woodworking when a plane is used. For those not familiar with a plane, it is a flat-bottomed housing with a very sharp, wide blade protruding at a shallow angle from the bottom surface. The blade is adjusted to protrude only slightly. In use, the plane is pushed forward across the wood surface removing a thin, smooth shaving.) Obviously, the wax surface is very thin. Even so, diamond particles must embed in the wax with a small portion of each particle protruding. Perhaps, orientation of the particles is the important factor.

Diamond particles, especially those derived from synthetic diamond, are blocky, i.e., resembling a child's wooden play blocks. However, blocky diamond particles may have many, more or less, flat sides intersecting at points. Nature very often selects an option that requires the least amount of energy. Therefore, we might expect the particles to enter the wax with a point downward. That, however, would leave us with a random distribution of points and flats protruding from the wax surface. Somehow, I do not think that happens. The very mild "planing" action suggests that the diamond particles orient themselves with a flat surface protruding at a slight angle. This orientation would leave a sharp, wide leading edge against the gem surface - very much like the carpenter's plane. My understanding of the physics of the situation is not good enough to explain why the diamond particles would choose to embed in such an orientation. I am simply extrapolating from the effects I see.

The French Connection - Having just admitted to considerable weakness in the field of physics, I now find myself disagreeing with the claims of a scientific and optical firm in France. This firm insists that polishing with diamond in the normal manner, i.e., with only diamond particles and an oil-based lubricant on the lap of choice, provides a particle "rolling" effect resulting in a polish. This view of "rolling" diamond particles has now permeated the entire amateur faceting field. My experiments with diamond on a waxed lap makes me totally unable to accept that view. In fact, I find that tumbling particles on a lap surface is disastrous if one is to produce a polished gem.

Remember those blocky diamond particles? Imagine them as used on a normal polishing or prepolishing surface. The lap is turning; the stone is pressed against the lap charged with diamond particles. Imagine the particles rolling or tumbling beneath the gemstone. At any given instant some diamond particles present a flat toward the stone; others present a slanted face, and some present a point directly toward the stone. What happens? Not much, in the cases of particle flats toward the gemstone, but what about those sharp, incredibly hard points meeting the gem surface? Particle diameter is greatest at the points, and contact pressure increases with these points facing the stone because pressure is distributed over a smaller area than with any other particle orientation. Momentarily, each diamond particle with a point upward against the stone MUST gouge a short track into the stone before rolling to present a larger surface area to the gemstone. I believe the waxed surface locks the diamond particles in place well enough to prevent rolling, if stone pressure against the lap and the lap speed are both low enough. Am I wrong? If so, I certainly invite anyone to correct my thinking.

Difficult Stones And the Waxed Lap - Some stones are a bit difficult to prepolish. Corundum often tends to glaze rather than prepolishing. Under the 10X loupe, the glazed surface shows innumerable semi-polished tiny areas bounded by pits and scratches. The waxed lap with 1,200-grit diamond, run at fairly low speed and light pressure, makes prepolishing a snap. Perhaps that nice topaz is finished except for the table, but you suddenly discover the table is too close to the angle of the cleavage plane. Try that waxed lap. And, of course, there are many other occasions to use this lap.

Perfect? - Of course this is not a perfect solution to all your troubles. Nothing ever is. Wax is soft compared to most polishing or prepolishing surfaces. Soft surfaces tend to cause slight rounding of facet edges. This effect is minimal on a waxed lap because the wax layer is so thin, but the effect is present. I'm not sure how well this lap will work on very soft gemstones, though I think it will work if very light pressure is applied to the stone together with low lap speed and short (a second or two) periods of application.

Polishing With A Waxed Lap - You can put a commercial grade polish on corundum using a Corian lap, waxed and charged with 14,000-grit diamond. Such a polish looks nice to the unaided eye but under magnification exhibits many very shallow scratches. I suspect 50,000-grit diamond on a waxed lap would do a fine job, but I have not tried that. I think one can wax almost any lap and use it in the same manner, be it metal, plastic or ceramic, but I have not tried those alternatives. There is a lot left to do in this area.

FACETING, CARVING ROCKS AND MINERALS OF NEW MEXICO

by Merrill O. Murphy, 2/14/97

MINERALS LIST

ACTINOLITE
(an amphibole) - A complex silicate of calcium, magnesium and iron, forming a series with anthophyllite and tremolite.

Mineral Characteristics - Monoclinic crystals may be short or long-bladed, transparent to translucent, usually greenish color. Actinolite is a rather brittle mineral with a hardness of 5 to 6. It has two directions of cleavage, one of them being fairly easy to initiate. To preform, saw only part way widthwise of the crystal on both sides, snapping off the end piece with the fingers. Shape on a fine-grit lap using little hand pressure. Expect cutting across the the crystal width to go much slower than along the length. Corners may fray. Despite the cleavage and cutting characteristics, actinolite is a rather tough mineral with little heat sensitivity. The index of refraction is about 1.61.

N.M. Probability - - For faceting rough, very poor; a slight possibility for small carving rough.

Locations - Best chances appear to be: 1)Grant County in the vicinity of Silver City and east to Central and Hurley, the Fierro-Hanover and Central (at Copper Flat) Mining Districts. One might try the dumps around the old Philadelphia mine. 2)San Miguel County north of Pecos in the Willow Creek Mining District, the Terrero and Elk Mountain mine dumps.

Applicable Maps - For location 1), State Highway and Mining District maps. For 2), add a Carson National Forest map to the list for location 1).

Access - There are a great many mines and prospects in the area described in location 1). Most of them require special owner permission to enter and collect. Contact the president of the Grant County Rolling Stones Gem and Mineral Society for further information. To collect in the San Miguel County, Willow Creek area, check with a Carson National Forest office.

ADULARIA - See **FELDSPAR**.

ALABASTER - (See **GYPSUM** and **SELENITE**).

ALBITE - See **FELDSPAR**.

AMBER/WHEELERITE
Most, if not all, of the New Mexico "amber" is really wheelerite. All may be classified as ambers, although there are undoubtedly small chemical differences. All are fossil resins but may be derived from the juices of quite different plants. The classic amber found along the shores of the Baltic Sea seems to have formed from the gummy exudations of a long-extinct evergreen tree similar to the American Arborvitae. The Baltic amber is often termed "true amber," intimating that all other ambers are different and inferior, but this is not necessarily true. Amber has been found, here and there, around the world, derived from various plants, having various colors and inclusions, having formed at vastly different times, some very good, some not so good. However, there is one common denominator. The gummy juices of all the amber-forming plants contained considerable amounts of succinic acid, a complex hydrocarbon. A major constituent of all amber is this rather uncommon acid.

Some ambers formed as much as 120 million years ago. Some have been around only a paltry 20 million years. In formation, the gummy constituents were buried to some depth under dirt intermixed with surface debris. The depth of burial resulted in moderate compaction pressures and temperature increases that physically changed the resinous, viscous liquids into stable solids. More extreme pressures and/or temperatures would have destroyed the resins. Depth of burial and age may have a bearing on amber's specific gravity and some chemical characteristics. For example, most ambers are only slightly soluble in alcohol. Wheelerite is quite soluble in alcohol. The only apparent difference is the much lesser age of the wheelerite.

Mineral Characteristics - Ambers are non-crystalline. They are brittle, have a hardness between 2 and 2 1/2 (about that of your fingernail) and a specific gravity between about 1.05 and 1.10.

The index of refraction averages about 1.54 - the same as quartz. Chemically, all ambers are about 79% carbon, 10.5% oxygen and 10.5% hydrogen. Impurities account for only a fraction of 1.0%. All ambers soften at close to 150 degrees C. (302.4 F.), are completely molten at 250 to 325 degrees C. (482 to 622 F.). They burn with a smoky flame, smelling of pine forests.

Lapidary Treatment - Every phase of lapidary treatment is tricky. Sawing to size is best done using a thin diamond blade and water coolant - lots of water. Press just hard enough to maintain cutting. If a vise is available, use it, but tighten it only enough to hold the piece. If the saw clogs up, stop to clean bits adhering to the blade. Twisting pressure or excess pressure will result in fracturing. If cabochon cutting or carving larger pieces, do not dop them. Smaller pieces and all pieces to be faceted must be dopped. Green dopping wax, barely molten, may be used in dopping. Cyanoacrylates (super glues) are suitable for dopping, but hot water laced with liquid detergent must be used to release the dop. Great care and patience must be used when removing any amber from a dop.

Grind gently on a 220-grit wheel or a 325-grit diamond faceting lap, using plenty of water. Too much pressure or too little coolant will quickly melt amber. Files, gravers and such hand tools are recommended for carving. Cabochons polish readily on slow-running, well-wetted leather laps with a little Linde A or tin oxide. Larger surfaces of carvings can be polished in the same way, but hand rubbing using a wetted leather strip is recommended for grooves, channels and sharp edges. A 400- or 1,200-grit diamond lap is best for cutting facets. 50 rpm is fast enough. Again, use light hand pressure and lots of water coolant. Several techniques will polish facets on amber, but most of them seriously round the facets. A wax lap with Linde A run at very slow speed will do the job. Even better is almost any polishing lap with a waxed surface. Proceed as follows: Select a polishing lap and clean it with warm water, liquid detergent and a brush.

N.M. Probability - - Fair for both faceting and small carving rough.

Amber is a possibility around any old coal mine dump. It has been reported from several locations such as: 1) the Gallup-Zuni Coal Basin near Ft. Wingate in McKinley County and San Mateo (northeast of Grants) in Cibola County, 2) the Rio Puerco coal field at La Ventana and to the north and the west in Sandoval and Mckinley Counties, 3) the San Juan Basin mines near Farmington in San Juan County.

AMBLYGONITE - N.M. Probability - - low.
Best chance seems to be the Pidlite deposits in the Rociada mining district of Mora County.

ANALCIME (a zeolite) - A sodium aluminum silicate, transparent, colorless, index of refraction only 1.48, hardness 5 to 5 1/2. Very rare in facet-able pieces of any size.

N.M. Probability - - only fair.
Easily found but facet-able rough not reported. The best chances are: 1) Todilto Park south of Window Rock in McKinley County, 2) the White Rock Canyon of the Rio Grande in Sandoval County.
ANATASE - Titanium Dioxide, transparent, brown or blue, index of refraction 2.5, hardness 6. Extremely rare as faceting rough.

N.M. Probability - - remote.
Best chances are: 1) a strange deposit six miles west of Ladrone Peak in Socorro County, 2) the White Sands Proving Ground, Organ mining district, south of Highway 70, one mile east of San Augustin Pass in Dona Ana County. (This is in a closed military reservation.)

ANDALUSITE - An aluminum silicate, transparent, green, pink, violet or red, brittle with distinct cleavage, index of refraction 1.64, hardness 7 to 7 1/2.

N.M. Probability - - "maybe".
Best chances are: 1) the Capitan quadrangle of Lincoln County, 2) the Ojo Caliente No. 1 and Petaca mining districts of Rio Arriba County, 3) the Glenwoody, Harding Mine, Honda Canyon and Picuris mining districts of Taos County.

ANDESINE - (See **FELDSPAR**).

ANGLESITE - A lead sulfate, and as such, may pose some health hazards in cutting. Transparent to opaque, white, gray or green, brittle, three directions of cleavage, hardness 3, index of refraction 1.88, very heat sensitive.

N.M. Probability - - fairly poor.
Found at many New Mexico locations but generally as thin coatings on galena. Best chance seems to be in the New Placers mining district of Santa Fe County, the Carnahan mine where crystals to 1/2 inch are noted.

ANHYDRITE - An anhydrous gypsum. (See **GYPSUM**, **SELENITE**, and **ALABASTER**). Crystals are rare; rough usually massive, more or less transparent to opaque, colorless to gray, tan, etc., hardness 3 to 3 1/2, index of refraction 1.57. Crystals very heat sensitive, difficult to cut and polish. Massive rough makes good carving material.

N.M. Probability - - for crystals of cut-able size and quality not good, very good for massive material.
Best chances are: 1) approximately one mile west of Canoncito in Cibola County - many pea-size crystals in gypsum are probably anhydrite, 2) (massive) around drilled water wells in Eddy, Chavez and Lea Counties, 3) (massive) around any gypsum or salt deposit.

ANORTHITE - (See **FELDSPAR**).

ANORTHOCLASE - (See **FELDSPAR**).

APATITE - The common name of a mineral series of very similar characteristics, considered here as one mineral. A calcium phosphate often including fluorine, chlorine, OH, or carbon.

Transparent to opaque, colors ranging from pale green to yellow, blue, violet, reddish and brown. A somewhat brittle material, slightly heat sensitive. Hardness of cut-able material about 5, index of refraction 1.64

N.M. Probability - - fair.

Best chances are: 1) the Organ mining district of Dona Ana County - some large yellow crystals noted in the literature, 2) the Harding Mine in Taos County - gray to greenish blue crystals, generally only translucent.

APOPHYLLITE - N.M. Probability - - very low.
Best chance: small veinlets in the South Canyon mining district in Dona Ana County.

AQUAMARINE - (See **BERYL**.)

ARAGONITE - N.M. Probability - - low.
Found all over New Mexico, but none reported of faceting size and clarity. Best possibilities would appear to be in south eastern New Mexico.

AUGELITE - N.M. Probability - - low; Northrop doesn't list **AUGELITE**.

AUGITE - (A pyroxene). This mineral is only translucent at best and has little to recommend cutting except, perhaps, to complete a collection. Color may be shades of green, brownish black to black. It is brittle, has a hardness of 5 to 6 and the surface is vitreous, to resinous to dull.

N.M. Probability - - good.
Best locations might be: 1) Lincoln County, the Nogal and White Oaks districts, "——crystals of augite, up to 1 1/2 inches long by 1/2 inch wide, —" (Northrop), 2) Sandoval County, Cochiti district, in a volcanic plug and associated dike about 5 miles southwest of Cabezon Peak.

AXINITE - N.M. Probability - - low.
The best chance seems to be in Sierra County, the Iron Mountain No. 2 mining district at Brown City Camp one to two miles east of the intersection of State Highways 52 and 59, ten miles north of Winston.

AZURITE - N.M. Probability - - low.
This copper carbonate mineral has been found in 21 of New Mexico's 32 counties. In almost every case, however, there is little if any cut-able, single mineral rough. The best chance seems to be the Magdalena area in Socorro County. Very nice specimen crystals have been found there, with round, marble-size specimens reported a short distance southeast of the old Kelly mine. Most of these are internally altered to mushy malachite. Other areas have produced masses of very tiny crystals mixed with malachite and unsuited to cutting.

BARITE - (A barium sulfate). This mineral may be transparent to opaque, colorless, brown or light blue. It is a brittle mineral with easy cleavage in two directions and is quite heat-sensitive. The hardness is 3 to 3 1/2, refractive index 1.63.

N.M. Probability - - good.
Barite has been found and even mined in many places in New Mexico. The sites listed by Northrop, however, are for large plates, clusters, sheaves and nodules. No data indicates these occurrences included transparent material. Best chances for faceting rough appear to be at the various fluorite locations and the sedimentary rocks south of Cabezon to I-40 and west to Gallup including an arc south to west of San Ysidro. Many areas of the state have yielded opaque to translucent material that could be carved, but colors are pale; cleavage, heat sensitivity

and softness leave such material little better than gypsum for carving purposes.

BENITOITE - N.M. Probability - - near zero.
One small California occurrence produces the only known benitoite.

BERYL - N.M. Probability - - excellent.
Many New Mexico locations produce mostly opaque to translucent ore grades. The best chances for faceting rough are: 1) the Ojo Caliente No. 1 and Petaca mining districts in Rio Arriba County. Rough runs from nearly colorless through shades of green, blue, yellow, and pink. A few faceted stones have been cut. 2) The El Porvenir and Tecolote mining districts adjoining Young's Canyon, Burro Creek and Gallinas Creek in San Miguel County - material is as described for Rio Arriba County. 3) the Harding Mine in Taos County - generally colorless, greenish or pale pink. A number of small stones have been cut. 4) A red beryl called BIXBITE (not to be confused with BIXBYITE) has been found in New Mexico in the last few years. So far as can be determined, this rich pink to red beryl is identical to that coming from southwestern Utah. So far as I know, all these New Mexico bixbite locations are in Sierra County and are grouped along the northern extension of the Black Range abutting on the Gila Wilderness. The 1956 edition of Northrop's Minerals of New Mexico does not mention bixbite; the 1996 (LaBruzza) edition gives two locations. 4a) A small prospect about 300 yards south of paved State Highway 59 well east of Beaverhead. The site is called the Paramount Canyon Site and is on the edge of the sharp drop into that canyon. The survey location is: center of S 1/2 Sec. 22, T. 10S., R. 11W). 4b) The second location is against Round (or Maverick) Mountain just north of Diamond Creek and seven or eight air-line miles southeast of the Paramount Canyon Site. The survey location is: Sec. 30, T. 11S., R. 10W. Stones found are usually quite small, although a very rare one may reach practical faceting size. The crystals appear in small vugs of a light-colored, frothy rhyolite. Associated minerals are small, colorless topaz, hematite and bixbyite.

When visiting either of the bixbite sites, bear in mind that you are a very long way from help in case of injury or automobile failure. The Paramount Canyon site is easy and practical if at least two automobiles are taken and the visitors exercise reasonable care. Consider the Round Mountain site to be impractical for the average visitor. Should you go despite this warning, DO NOT CONSIDER TAKING DOGS! There are lots of black bears in this area, although you are not likely to see them. The trouble is that dogs smell them and shift into mindless attack mode. If they catch the bear, it will maim or kill them.

To reach either site, first find State Highway 52 and the little town of Winston on the highway map. State Highway 59 dead ends against 52 ten miles north of Winston. State 59 (paved) runs west from that intersection. The Paramount Canyon site is approximately 19 miles west of the State 52/59 intersection. Watch for a parking strip on the south side of State 59. A faint track, passable to cars, runs south about 250 yards before disappearing at the collecting site. Small piles of broken rocks just east and south of the track ending define the collecting site. Minor rock breaking will be necessary to find the scarce, tiny specimens. Bixbyite and glittering hematite can be found at the very edge of the canyon.

The route to Round Mountain is more complex. Drive west on State 59 for about 16 miles beyond the intersection with State 52, watching carefully on the south side of the road for dirt intersecting National Forest road 226. Turn south on 226. Note that, some distance along this road, you will pass through some private property with still-standing houses. Follow 226 roughly south for about eight miles (ignoring an intersecting side road, 226A) until the intersection with Forest road 500 is reached. Follow 500 about seven more miles (distances are estimated from the Gila National Forest map). The last two or three miles of Forest road 500 run southeast along a gently sloping valley. Watch for a fence (and gate) crossing the road from northeast to southwest. Go through the gate and park. The trail to Round Mountain heads back in the trees and runs southwest parallel to the fence. It may be difficult to find. This trail will reach a second fence about 3 to 4 miles in then turn north. Presumably, the prospect was on the west side of Round Mountain, but there is no apparent trail beyond the fence. Round Mountain, itself, is not particularly impressive but is the highest point along the trail.

BERYLLONITE - N.M. Probability - - low.

Beryllonite has been reported from Rabb Canyon, Grant County, but this report is believed to be erroneous.

BIXBYITE – N.M. Probability - - fair.

Bixbyite is a rare manganese-iron oxide with a hardness of 6 to 6 1/2. It crystallizes in the cubic system and exhibits a black, metallic sheen. Poor crystal specimens can be faceted into nice but quite small tablets. Known NM locations are all within the Gila Wilderness and Black Range areas of Catron and Sierra Counties. The Catron county locality is a prospect near Beaverhead at Beaver Creek. The exact location is in the NW 1/4 SW 1/4 Sec.2, T.11S., R.12W. The several Sierra County sites are: 1) In a frothy rhyolite about 300 yards southeast of paved State 59 and on the very edge of Paramount Canyon. The survey location is: The center of S 1/2 Sec. 22, T.10S., R.11W. 2) A small shaft 200 yards north of Hardcastle Creek, survey location NW 1/2 NE 1/4 Sec. 4, T.10S., R.10W. 3) A small prospect 200 yards northeast of Scales Creek, listed survey location NW 1/4 NW 1/4 Sec. 31, T.10S., R.10W. 4) A small prospect a quarter mile north of locality 3 and the same distance northeast of Scales Creek. 5) At the base of Round (or Maverick) Mountain, survey location Sec.30, T.11S., R.10W. (The same location as the Round Mountain bixbite site listed for beryl, above.

BORACITE - N.M. Probability - - very low.
No known reports for New Mexico.

BRAZILIANITE - N.M. Probability - - very low.
No known reports for New Mexico.

BYTOWNITE - (See **FELDSPAR**).

CALCITE - N.M. Probability - - certain.

Calcite has been reported from every county in New Mexico, but is not usually of facet-able quality. Best chances are: 1) in concretions along the Rio Puerco Valley and its tributaries in Bernalillo, Sandoval, and Valencia Counties, 2) the Organ mining district of Dona Ana County, 3) clear, scalenohedron and prism crystals of transparent, colorless calcite in a small prospect 3/4 mile west of the intersection of Highways I-25 and US 380 (just west of San Antonio in Socorro County). A great many crystals adhere to slabs of rock in the shallow prospect. The prospect is on the north side of the gulch just west of a low bluff. In the last few years, vandals have destroyed nearly all surface crystals from this site. 4) The Harding mine and a large pit 1/2 mile northwest of the Harding Mine in Taos County, 5) Cookes Peak, Little Florida and Tres Hermanas mining districts in Luna County. As "Mexican onyx" and travertine, etc., the massive forms of this mineral appear at a number of locations. One such location is the extensive "marble" area west of Belen along the west side of the Rio Puerco valley south of Highway 6.

CANCRINITE - N.M. Probability - - very low.
Best chance, the Chico phonolites of eastern Colfax County.

CASSITERITE - Cassiterite is a rather rare tin oxide mineral very often containing iron compounds.
Transparent cassiterite is colorless to yellow to brown; opaque varieties are brown, reddish or black, often banded and looking like petrified wood (wood tin). Other opaque rough may be simply pebbles. The hardness of transparent material is usually 7; hardness of "wood tin" may drop to as low as 6, index of refraction is 1.99 to 2.09. Though a bit brittle, it is not heat sensitive and polishes readily - a truly wonderful cutting material.

N.M. Probability - - very poor for transparent rough, good for "wood tin" and other opaque varieties.

Opaque varieties of cassiterite have been reported from numerous prospects in the Taylor Creek mining district of Catron and Sierra Counties, also in the far southwestern corner of Socorro County. No transparent material of usable size has been reported, although opaque material containing iron and manganese might be cut into faceted tablets. A wood-grained brown variety called "wood tin" is also found.

Best chances are: 1)areas in Catron and Sierra Counties centering around a point labeled "Tin Mines" on the Gila National Forest map. To reach the Tin Mines, find the village of Winston on State Highway 52 in northwestern Sierra County. Drive ten miles north of Winston to the intersection of State 52 and State 59. Turn onto State 59 and drive <u>about</u> 15 miles west; Turn northwest on Forest Service road 667 and follow it to its intersection with Forest Service road 668. The "Tin Mines" is about one mile west on 668. 2) The Socorro County source is reached on State Highway 52. Continue north on State 52 for 11 miles past the intersection with State 59. At this point, State 52 (now unpaved) intersects with State 142. There are scattered deposits of cassiterite running southeast for at least five miles along State 142 from its intersection with State 52. Some of the cassiterite is crystalline (tiny but brilliant), appearing with specularite in rhyolite cavities.

CELESTITE - This is a strontium sulfate mineral usually in crystals resembling barite. It may be transparent to barely translucent; colors are white, bluish, and occasionally reddish. It exhibits a distinct cleavage in three directions, is brittle, somewhat heat sensitive, has a hardness of 3 to 3 1/2, and an index of refraction of 1.62.

N.M. Probability - - fair to good.
Best chances are: 1) in concretions along the Rio Puerco Valley and its tributaries in Bernalillo and Sandoval Counties, 2) an area west to south of San Ysidro in Sandoval County, 3) an area from northeast to northwest of Laguna in Cibola County.

CERUSSITE - This is a lead carbonate mineral and could be toxic during cutting and polishing. Use of a breathing filter mask is recommended. It is crystalline, transparent to barely translucent, white, gray to nearly black. It exhibits two directions of easy cleavage, is brittle and very heat sensitive. The hardness is 3 to 3 1/2, the index of refraction 1.90 to 2.07.

N.M. Probability - - good.
Best chances are: 1) the Organ mining district of Dona Ana County, 2) the many mining districts surrounding Silver City in Grant County, 3) the Cerrillos and New Placers mining districts of Santa Fe County, 4) numerous mining districts along the lower east slopes of the Black Range from Chloride to Lake Valley in Sierra County, 5) several mining districts near Socorro, Magdalena and Bingham in Socorro County, 6) any lead mine in the state.

CHABAZITE - (a ZEOLITE) - Usually found as poorly formed small crystals or "lumps" in various lavas, seldom as free rough. Chabazite is transparent to translucent, colorless to white, pink or brownish, brittle, heat sensitivity may create problems. The hardness is 4 to 5, the index of refraction under 1.5.

N.M. Probability - - fair.
Best chances are: 1) Dry Leggett Canyon west of Reserve in Catron County a short way west of the intersection of US 180 and State 12 (small crystals in andesite), 2) Church Creek, Jemez Springs mining district, Sandoval County (3 mm cubic crystals in lava boulders behind the old Spanish mission).

CHALCOPYRITE - (see **PYRITE**, also) –
N.M. Probability - - certain.
Found at most copper mines and prospects. Not normally considered a faceting mineral but produces bright, interesting faceted tablets. Cut faces quickly oxidize to produce attractive spectral colors.

CHONDRODITE - N.M. Probability - - very unlikely.
Northrop does not mention chondrodite.

CHRYSOBERYL - N.M. Probability - - remote for faceting size and grade.
Best chance is in Taos County. Northrop reports very tiny yellow crystals in a pegmatite on a ridge west of the head of the south fork of Rito de los Cedros about 5.2 miles south of the village of Costilla.

CHRYSOCOLLA - N.M. Probability - - certain, however most lapidary chrysocolla is actually chrysocolla, malachite, azurite and other copper minerals enclosed in chalcedony. True chrysocolla has a hardness of only 2 to 4 and is usually brittle. That enclosed in chalcedony exhibits the 7 hardness of the enclosing material.
Best chances are near any copper mine or prospect in the state.

CINNABAR - N.M. Probability - - near zero.
Cinnabar has been many times reported in New Mexico but only recently verified; apparently occurring in very small quantities at least two locations. No lapidary material reported.

CLINOZOISITE - N.M. Probability - - low.
Found as tiny crystals, usually pale green, in several New Mexico mines and prospects. The best chance appears to be on a ridge south of Discovery Gulch in the Iron Mountain No. 2 mining district of Sierra County.

COLMANITE - N.M. Probability - - near zero.
Northrop does not list colmanite although the potash mining areas of southeastern New Mexico are a remote possibility.

COLUMBITE-TANTALITE - This is a relatively rare mineral, an iron-manganese-niobium-tantalum oxide named for the elements columbium (now called niobium) and tantalum. The niobium/tantalum ratio may vary widely. Columbite-tantalite is a heavy, opaque, metallic black mineral crystallizing in the orthorhombic system.

Specimens are usually more or less cubic shapes with somewhat rounded surfaces and corners. It is a brittle mineral, hardness 6 to 6 1/2 and polishes readily, exhibiting hematite-like brilliance. Specimens run from small to many pounds. Cutting material should consist of poor specimens and bands within chunks of fractured quartz.

N.M. Probability - - good.
The best chances seem to be in the Carson National Forest, Rio Arriba County, Petaca and Ojo Caliente No. 1 Mining districts. There are at least 75 pegmatite deposits in the Petaca district of which 62 have some to much columbite-tantalite. The abandoned Globe mine area might be a good place to start looking, although most of the old abandoned mines in that area may, also, be reasonable places to search. The nearest town of any size is Ojo Caliente. Other sites are in pegmatites of San Miguel County, the Elk Mountain, Cow Creek and Tecolote districts, as well as the area of the famous Harding mine in Taos County.

CORDIERITE - (see **IOLITE**).

CORUNDUM - N.M. Probability - - for faceting size and quality is poor.
During Spanish exploration and occupation and up until the early 1900's, there were numerous unverified reports of corundum in this region. Most of these were probably mistaken identification of peridot and garnet. Best chances are: 1) the Modoc mining district of Dona Ana County, 2) light blue corundum in Lincoln County (check letter Ming-Shan to Northrop, 2/12/57), 3) there are persistent unverified reports of small sapphires in various gravels of Santa Fe County.

CROCOITE - N.M. Probability - - near zero.
Northrop does not list crocite. Chromium minerals are nearly nonexistent in New Mexico.

CRYPTOMELANE - N.M. Probability - - as a distinct mineral very poor. (See **PSILOMELANE**.)

CUPRITE - N.M. Probability - - for facet-able rough is only fair to poor.
Cuprite is a constituent of many New Mexico copper ores but is usually noted as a dusting of exceedingly tiny crystals. The best chances appear to be: 1) the Fierro-Hanover and Santa Rita mining districts of Grant County, 2) two dangerous prospects on the west side of Las Huertas Creek south of Placitas and northwest of the Sandia Man Cave, Placitas mining district in Sandoval County. Crystals I have seen do not exceed 1/32nd. Inch on a side.

DANBURITE - N.M. Probability - - near zero.
Northrop lists no danburite occurrence in New Mexico.

DATOLITE - N.M. Probability - - poor.
In 1875, Loew reported datolite from the headwaters of the Gila River. There are no other reports. The composition of datolite, danburite and topaz are sufficiently similar to make one wonder why topaz is present but danburite and datolite are not.

DEMANTOID - (see **GARNET**.)

DESCLOIZITE - N.M. Probability - - poor for material of facet-able size.
The best possibility might be in Sierra County, the Lake Valley district where, in 1885, dark red crystals to 2 mm and blackish-red crystals to 8 mm were described. These may have been cuprodescloizite.

DIAMOND - N.M. Probability - - poor.
Diamonds have been found in New Mexico but in no particular concentration at a given locality. The only exception "may" be a large region west and south of Shiprock. Kimberite and kimberlite-like pipes, which often produce diamonds, are known to exist from the Four Corners area south to Window Rock.

DIOPSIDE - N.M. Probability - - only fair for faceting rough.
Diopside is common at several New Mexico mines, but lapidary grades have not been reported. Best chances are: 1) the Organ and South Canyon mining districts of Dona Ana County, dark green bladed crystals to 8 inches, 2) Green Knobs in western McKinley County (small, intensely green bits, may be colored by chromium), 3) San Juan County, at Mitten Rock southwest of Shiprock, many nodules of diopside up to 9 inches in length were reported in 1936.

DIOPTASE - N.M. Probability - - very poor.
Northrop cites minor finds at Santa Rita, Grant County and at Orogrande, Otero County.

DOLOMITE - N.M. Probability - - very good.
Faceting grade dolomite of fine quality was once advertised from somewhere near Santa Rosa. Al Huebler

(deceased) of the New Mexico Faceters Guild cut a very fine stone from this material a few years ago. Hint: research old Lapidary Journal ads and make local inquiries. Best chances are: 1) the Santa Rita area, 2) near Lake Arthur in Chaves County, 3) just south of Dunlap in De Baca County.

DRAVITE - (See **TOURMALINE**).

DUMORTIERITE - This material is listed as an aluminum borate silicate oxide. It is translucent, at best, in New Mexico. While the hardness is 7, lapidary texts indicate most material is difficult to polish.
N.M. Probability - - appears to be good.
Best chances are: 1) Tres Hermanas mining district of Luna County, 2) the Petaca mining district of Rio Arriba County, on the west slope of La Madera Mountain, in two steep gulches, about 1/2 mile southeast of La Madera village. The material of this occurrence is described as steel-gray with a dark bluish lavender tint. It is said to occur in "sunbursts of sheaves to 3 inches across."

ELBAITE - (see **TOURMALINE.**)

EMERALD - (see **BERYL**.)

ENSTATITE - (A pyroxene) Enstatite is a magnesium silicate. It may be translucent to opaque, rarely transparent. Colors are: grayish white to yellowish, olive-green or brown. Single crystals are rare. It usually occurs as massive material or fibrous masses which may be chatoyant. Crystalline material is brittle, readily cleavable. The hardness is 5 to 6, the index of refraction is 1.65.
N.M. Probability - - very good for opaque to translucent material, poor for transparent rough.
Best chances are probably: 1) in bits associated with diopside at Green Knobs, McKinley County, tiny, but spectacular, catseye tablets are possible from this material. 2) The variety called bronzite occurs in a dike northwest of Cabezon Peak in Sandoval County (identified by Al Huebler, 1991). The bits found are barely large enough to facet and are dark brown. Larger crystals are said to occur in a volcanic plug a few miles to the west. If this report is true, the larger crystals are undoubtedly nearly opaque. 3) Shiny black pieces of bronzite appear with faceting grade labradorite in the Brushy Mountains south of Pueblo Park Campgrounds in Catron County. Pieces are seldom larger than 3/8 inch but cut and polish readily. Some pieces show a weak catseye effect.

EPIDOTE - Epidote is a calcium, aluminum and iron silicate. It is a very common New Mexico mineral but is usually found as a massive, granular, opaque rock or rock coating. Faceting material is transparent to translucent, leek- or pistachio-green, brownish green or greenish black crystalline rough. Carving or tablet rough may be found as compact masses of tiny crystals. Faceting material has a hardness between 6 and 7, a refractive index of 1.66
N.M. Probability - - certain for carving and tablet rough, only fair for facet grade.
Best chances are: 1) in the Juan Tabo Park area of Bernalillo County against the first sharp rise of the Sandia Mountains about 1/2 mile south of the start of the La Luz Trail, 2) the Capitan mining district of Lincoln County, 3) in the Sylvanite and Lordsburg mining districts of Hildalgo County, 4) the Chloride, Hillsboro, Iron Mountain No. 2 mining districts of Sierra County, 5) Taos County, Montgomery (1953 report) noted pink thulite and pale green epidote occurring in a layer nearly a foot thick about 1/2 mile north and one mile northeast of the famous Harding mine - no statement on transparency.

EUCLASE - **N.M. Probability** - - poor.
Reported in the Cochiti mining district of Sandoval County (very doubtful) and in the vicinity of Taos - no specifics.

FAYALITE - (an **OLIVINE**) - **N.M. Probability** - - "maybe."
Fayalite was reported (A. D. Zapp - 1941) in the Cornudas Mountains of Otero County. There is a bare possibility that some of the peridot of the Green Knobs and Red Lake area of McKinley County is, actually, fayalite.

FELDSPAR - There are several species and subspecies all of which are silicates of aluminum with potassium, sodium or calcium. (The three variable minerals are termed "alkali elements". In most feldspars, one of the alkali minerals will be predominate with the other alkalis present in minor quantity.) Crystal formation is monoclinic or triclinic, and the members of the mineral group are quite similar in appearance, hardness and cleavage. The hardness is 5 1/2 to 6 1/2 and cleavage is in two directions at nearly 90 degrees to one another. Colors run from white through most of the pastel range, and individual specimens may run from transparent to opaque. Feldspars are divided, for convenience, into two groups, those called potassium feldspars and a second group called plagioclase feldspars. The potassium feldspars contain little or no sodium or calcium, the plagioclase little or no potassium. The potassium feldspars are:

Anorthoclase
Microcline - (Amazonstone and Microcline-perthite)
Orthoclase - (Adularia, Cryptoperthite, Microperthite, Moonstone, Perthite, Sanidine, and Soda-sanidine)

The Plagioclase Series are:

Albite - (Cleavelandite and Moonstone)
Andesine
Oligoclase
Labradorite
Bytownite
Anorthite

FELDSPARS INDIVIDUALLY

ANORTHOCLASE - (similar to orthoclase) -
N.M. Probability - - poor. Faceting grade is unknown.

MICROCLINE - Microcline is a potassium aluminum silicate, possessing the same chemical composition as orthoclase but crystallizing in the triclinic mode rather than the monoclinic mode. It runs from transparent to barely translucent, however no transparent material has been reported from New Mexico. Colors range from white through pale cream-yellow, red and green (the green is usually pale to medium green and commonly called amazonite or amazonstone). Somewhat brittle, pearly, hardness 6 - 6 1/2, index of refraction about 1.53.

N.M. Probability - - very good for tablet-cutting or carving material.

Best chances are: 1) Petaca mining district in Rio Arriba County, where large to huge crystals and masses are found in nearly all mines and prospects. Colors run the feldspar gamut. 2) Harding Mine in Taos County. Also in the Glenwoody, Picuris and Red River districts of that county. Microcline-perthite is a microcline with striking intergrowths of plagioclase feldspar. Many of the Petaca district mines contain microcline with this intergrowth. 3) Santa Fe County, a few miles east of Espanola, at the east end of Santa Cruz Lake and for at least a mile up Santa Cruz Creek, a nice, translucent red, massive feldspar with intergrowths of quartz looking like Cuniform writing, called graphic granite - probably microcline.

ORTHOCLASE - Orthoclase is a potassium aluminum silicate crystallizing in the monoclinic mode. Orthoclase is usually translucent to opaque, although transparent faceting rough is known from places outside New Mexico. Colors range from white to gray, pale yellow and flesh-red. Transparent rough may be colorless or yellow. Somewhat brittle; hardness 6 to 6 1/2, index of refraction about 1.52. There are a number of descriptive terms applied to orthoclase, most of them describing variations from the basic mineral. Northrop (‘59) includes: adularia, cryptoperthite, microperthite, perthite, moonstone, sanidine, soda-orthoclase and soda-sanidine. Adularia is listed as a transparent to milky orthoclase with a glassy appearance. If it exhibits a blue or silvery glow, it may be, also, termed moonstone. The moonstone glow is called adularescence. Albite feldspar frequently forms intergrowth layers within orthoclase, and the resulting structure is termed cryptoperthite, microperthite or perthite as the plate thickness ranges from too small to be seen microscopically, through microscope visible, to visible by eye. Sanidine is a high-temperature crystallization of orthoclase found in volcanic rocks. The prefix, soda-, preceding orthoclase or sanidine indicates some sodium in the crystallization. The sodium content usually derives from perthitic intergrowths of albite, a high sodium-content plagioclase feldspar. It is interesting to note that albite intergrowth is present in most of the sanidine found in New Mexico and seems to be the cause of adularescence seen in this feldspar.

Best chances for **ORTHOCLASE** for facet-cut tablets or carving are: 1) Bernalillo County, Placitas and Tijeras Canyon mining districts, phenocrysts to 10 mm long in metamorphic and igneous rocks in the Juan Tabo area northeast of Albuquerque, 2) Crystals to 3 inches long on the west slopes of the Sandia Mountains just east of Albuquerque and north of Embudo Canyon, 3) Grant County, the Burro Mountain, Central and Santa Rita mining districts. There are other possibilities.

Best chances for **SANIDINE**, (moonstone, adularia and perthites) are the locations listed below, although very small bits of these orthoclase variations are very common in volcanic rocks of the western half of New Mexico. 1) small bits to 1/4 inch of gleaming blue sanidine moonstone in the volcanic rocks of Sandoval County in the higher elevations of the Jemez Mountains. Cut-able small fragments have come from an area along County/Forest Road 268 between Bland (a nearly ghost mining town) and the Valle Grande. 2) The Rabb Canyon Pegmatites, Grant County, the western side of the Black Range. (These are very unusual pegmatites in that they were locally formed, at very shallow depth in lavas, by very hot water under extreme pressure. 24-inch crystals of sanidine have been reported but are locked in a hard, rubbery matrix rock that defies crystal extraction by usual mining methods.) To reach the Rabb Canyon site, first find the town of Truth or Consequences on your road map. About 11 miles south of Truth or Consequences, paved State Highway 152 branches off I-25 and runs west to Silver City, crossing over the Black Range at Emory Pass in the process. From Emory Pass, the highway drops steeply down the Iron Creek canyon for approximately 9 miles before leaving the creek and climbing over a low ridge. About 1/2-mile west of the ridge top, there is a minor turn-out and stock corral on the north side of the highway. Take this turn-out and, almost immediately, turn west and STOP! A dim dirt road continues west less than 1/2-mile to Noonday Canyon and a tiny creek crossing, then continues north to a small clearing with a fence across the upper end. The first 200 feet of this road is usually impassable to automobiles, although a high-clearance vehicle may negotiate it. The Rabb Canyon trail begins on the west side of the small clearing mentioned above. It is a rugged trail running roughly northwest and dropping down into Rabb Canyon, turning up the canyon for, perhaps, 1/2-mile, then turning north to a log stock corral. Just beyond the corral, the trail crosses a shallow gulch and trends northwest about 1/2-mile up a little valley to a relatively flat 2-acre, semicircular, bench with huge, old alligator-bark juniper trees. Sanidine moonstone prospects are on the west and north edges of the bench, but rough pieces may be found in the loose sands anywhere on the bench. The sanidines are water-clear and show a vivid blue or silvery adularescence and sharp Bavino twinning - arguably the best moonstone in the world. Many tiny pieces can still be found or dug from the faces of the old prospects, although most will have cracks or partial cleavages. Some material thought to be adularia is found about 1/4 mile south of the main sanidine site. It is “sleepy translucent” and exhibits no adularescence. NOTE: I RECOMMEND GOING TO THIS SITE WITH SOMEONE FAMILIAR WITH THE TRAIL AND THE LOCATION. The trail disappears in several places, and is difficult to find again. Water found in this area is contaminated by cattle.

PLAGIOCLASE FELDSPARS - ALBITE, OLIGOCLASE, ANORTHITE and ANDESINE, as distinct minerals, appear to have no gem significance in New Mexico although electron microprobe tests of Catron County labradorite indicate a very thin outer layer of andesite.

LABRADORITE - N.M. Probability - - certain.

Best chances are: 1) a light straw to good yellow transparent rough is found in the basalts of the Pueblo Park area of Catron County about 25 miles southwest of Reserve, the location extending into Arizona on the west and, in smaller grains, to Highway 60 on the north, 2) Loew, 1875, reported transparent labradorite in the glassy andesites of San Antonio Mountain in Rio Arriba County. (This is probably the 11,651-foot mountain now called Chicoma Mountain. It is about 17 airline miles west of Espanola.) These are described as relatively large and marked by vivid prismatic colors. The location, if it existed, is no longer known. 3) Loew also described labradorite like 2, above, in a basalt plug five miles southwest of Cabezon Peak in Sandoval County. 4) V.C. Kelly, geologist formerly at U.N.M., displayed a transparent, light amber cleavage block with brightest blue labradorescence from the Jemez Mountain area, Sandoval County. 5) Labradorite similar to that in Catron County has been reported in Dona Ana County south of the town of Hatch.

To reach the Catron County labradorite, first locate the junction of U.S. Highway 180 and State Highway 12 west of Reserve. About 4 1/2 miles south of this intersection, State 180 is intersected by dirt Forest Road 232. Road 232 leads west about 6 miles to Pueblo Park Campground before crossing Pueblo Creek and continuing to Blue, Arizona. Park at the Pueblo Park Campground and walk south a little over 1/2-mile to the, more or less, flat top of a high mesa. That is the first of three mesas having labradorite crystal cleavages free in the soil and in the basaltic rocks of an old lava flow. There has been heavy collecting in that area since about 1970, so most of the larger faceting rough pieces have been removed from the surface. Larger and better rough may still be found on mesas 2 and 3 to the south. These mesas can be reached by a long walk down the Pueblo Creek canyon followed by a half-mile very steep climb to the mesa tops. The creek is on an old fault line, and the lava flow producing the labradorite is 500 feet or more higher on the west side of the creek.

BYTOWNITE - N.M. Probability - - unlikely.

When I found the FELDSPAR in the Pueblo Park area (1969), I had index of refraction tests run by two practicing gemologists. Their readings of 1.570 convinced me this feldspar was bytownite. I called it that, and the name was accepted in the faceting world. Recent, far more extensive and more accurate, testing by Paul Hlava, Sandia Laboratories, proves that this material is labradorite. A lighter yellow feldspar, often larger than 100 carats per piece, is now being mined in northern Mexico and sold as bytownite. I suspect it, too, is labradorite or andesine. Bytownite is once again an unknown faceting material.

FELSPATHOIDS - This group of feldspar-like minerals will be covered as each is encountered alphabetically.

FIBROLITE - (see **SILLIMANITE**).

FLUORITE - N.M. Probability - - certain.

Fluorite has been found and mined in dozens of places in New Mexico. Best chances are: 1) in and around the Doc Long Recreation Area on State Highway 536 northwest of Cedar Crest in Bernalillo County, pale green cleavages to 3/4 inch, 2) in almost all the many mining districts around Las Cruces and Organ in Dona Ana County. Most of this rough is colorless to pale green. An easy location is prospects 1/2 mile east of Organ and a lesser distance north of US 70. 3) In almost all mining districts in the Silver City and Burro Mountains region of Grant County, 4) in the Cooke's Peak mining district of Luna County, a spectacular lime green and other colors in large pieces, 5) in numerous mining districts in the southern part of Sierra County. Of particular interest is that in the Grandview Canyon district east of the villages of Arrey and Derry. 6) In most of the mining districts of Socorro County, particularly the Hansonburg district southeast of Bingham where large cleavages of blue, green and purple rough are found. These are very fragile and difficult to facet. 7) The Zuni Mountains mining district of Valencia County, particularly the Mirabal mine near Diener and Bluewater, 8) At least 12 mines in the Gila Fluorite district a few miles more or less east of Gila in Grant County, very nice material in a number of colors. All fluorites lose color depth when subjected to strong lighting. Color is very unstable in specimens from 6, above, those from 4, above, seem most stable.

FRIEDELITE - N.M. Probability - - near zero.

Friedelite is not mentioned by Northrop.

GADOLINITE - N.M. Probability - - poor to fair.

This is a very rare mineral, beryllium iron yttrium silicate, usually only translucent to opaque.

Best chances appear to be: 1) in the Petaca mining district of Rio Arriba County, 2) in the Elk Mountain district of San Miguel County, the pegmatites east of Cow Creek.

GAHNITE - (see **SPINEL**).

GARNET - There are a number of subspecies which are listed below. Most of these subspecies may be transparent and can be faceted into beautiful gems. The hardness ranges between 6 1/2 and 7 1/2 and the index of refraction between about 1.75 and 1.89.

ALMANDITE (or **ALMONDINE**) - Deep red to purplish red.

N.M. Probability -- poor.

Best chance is in the Capitan Quadrangle of Lincoln County.

ANDRADITE (and its subvariety, **DEMANTOID**) - Yellow, brown or black; demantoid is green.

N.M. Probability - - very good for andradite, poor for demantoid.

Best chances: 1) in the Modoc, Organ and South Canyon mining districts of Dona Ana County, 2) in the Apache No. 2 and Sylvanite mining districts of Hidalgo County - demantoid (Rosenzweig, 1957), 3) in the New Placers mining district of Santa Fe County, particularly in and near the San Pedro mine. (A particular site is about 1/2 mile northeast of the San Pedro mine. A dirt road runs from the mine, crosses a ridge and turns to the north. The site is at the point where the road crosses the ridge and turns north. Good brown andradite crystals to 1/2 inch can be found but are more translucent than transparent. Many crystals are iridescent as a result of very thin growth interlayering with grossularite garnet. Small yellow, transparent crystals lacking iridescence are found at the same location. 4) Glenwoody mining district of Taos County, good crystals but generally opaque.

GROSSULARITE (and its subvariety **HESSONITE**) - Colors, amber or pink; hessonite, orange to red-orange.

N.M. Probability - - very good for grossularite, poor for hessonite.

Best chances: 1) in the Modoc, Organ and South Canyon mining districts of Dona Ana County, 2) in the Fierro-

Hanover mining district of Grant County - large, beeswax-yellow crystals, 3) in close association with andradite in Santa Fe County as described for andradite "3)" above.

PYROPE - Color, deep red.
N.M. Probability - - very good.
Best chances are: 1) in the Green Knobs/Red Lake area north of Window Rock in McKinley County. Many of these garnets are paler than normal pyropes - some to light lavender - and may be rhodolite. 2) Red, raisin-size, appearing to be pyrope, are found in a pink granite just north of I-25 and two or three miles southwest of Las Vegas in San Miguel County. Turn off I-25 onto State 283 and go 1/2 mile or so north. 3) A site in northwest San Juan County is west of Shiprock and just off U.S. Highway 64. It is on a low mesa, beginning a hundred yards or so north of the highway in the vicinity of Teec Nos Pos, Arizona. Note that this location is on a Navajo Indian reservation and may be in Arizona.

RHODOLITE - N.M. Probability - - poor.
Note that the pale pink to violet garnets of the Green Knobs/ Red Lake area in McKinley County may be rhodolite.

SPESSARTITE - Spessartite colors may range from pink to brown but are more usually a lustrous red.
N.M. Probability - - only fair and good faceting grade may be difficult to find.
Best chances are: 1) in the Rociada mining district of Mora County, 2) in the Elk Mountain, El Povenir and Willow Creek mining districts of San Miguel County. Samples from San Miguel County may contain yttrium. 3) Spessartite garnets to inches in diameter have come from mines in the Ojo Caliente and Petaca districts of Rio Arriba County. None of the large ones are cut-able. An occasional small one may be of good quality. Good possibilities might be the Pavo and Globe mines in the Petaca district.

UVAROVITE - This garnet is emerald-green.
N.M. Probability - - poor.
Best chance is in the South Canyon mining district of Dona Ana County.

TSAVORITE - This garnet, unknown outside of Tanzania, Africa, is a bright lime green color.
N.M. Probability - - near zero.

GARNET - Subspecies unidentified. Garnet fitting this category has been found in all the counties of the western half of New Mexico. Most such identifications are old and the details not very specific. For this reason, I refer readers to Northrop's Minerals of New Mexico, any edition.

GLAUBERITE - N.M. Probability - - fair.
Glauberite may be transparent and of various colors, is very soft and somewhat water soluble - a nightmare to facet. Best chance is in the Carlsbad potash mining district of Eddy County.

GYPSUM - (see **SELENITE**).

HALITE - (common table salt) -
N.M. Probability - - very good.
Best chance is in the Carlsbad potash mining district of Eddy County. An intense blue variety is very occasionally seen. It is soluble in water but has been faceted.

HAMBERGITE - N.M. Probability - - very low.
Northrop does not list HAMBERGITE.

***HEDENBERGITE - N.M. Probability - -** good.
HEDENBERGITE is a PYROXENE, end member of the DIOPSIDE series and translucent at best. Best chances are: 1) at the Quickstrike and Ben Nevis mines in the Organ mining district of Dona Ana County, 2) in the Fierro-Hanover mining district of Grant County, 3) in the Iron Mountain No. 2 and Magdalena mining districts of Sierra and Socorro Counties.

***HELVITE - N.M. Probability - -** only fair for facetable crystals but the only known possible source.
Best chances are: 1) the Iron Mountain No. 2 mining district of Sierra County - the best possibility, 2) the Morlock and Eloi claims in the Victorio mining district of Luna County.

HEMATITE - N.M. Probability - not very good.
Northrop lists a large number of HEMATITE occurrences, but there is no indication of crystalline material suitable for faceting. The best chances might be: 1) in the Petaca mining district of Rio Arriba County - "numerous veins occur on the west slope of La Madera Mountain; most of these are near the base of the mountain, about a 1/2 mile southeast of Madera." 2) In the Cerrillos, New Placers and Old Placers mining districts of Santa Fe County.

HEXAGONITE - (see **TREMOLITE**).

HODGKINSONITE - N.M. Probability - very low.

Northrop does not mention HODGKINSONITE. It is a zinc mangano-silicate. Zinc, manganese and silicates are prominent in New Mexico minerals and mining, so HODGKINSONITE is an unmentioned possibility.

***HORNBLENDE - N.M. Probability -** fair.

There are numerous possibilities. Best chances seem to be: 1) in the Black Hawk, Burro Mountains, Chloride Flat, Eureka, Fierro-Hanover, Pinos Altos, Santa Rita, Silver City and Steeple Rock mining districts of Grant County - relatively large crystals but generally deep colored. The Pinos Altos district lists some colorless to pale green crystals in granodiorite. 2) In the Green Knobs area northeast of Red Lake in McKinley County - "cores of large, colorless PYROXENE crystals in HORNBLENDES nearly one inch in diameter (Balk and Sun, 1954, p.116)."

***HYPERSTHENE - N.M. Probability -** questionable. HYPERSTHENE is the iron-rich end member of the ENSTATITE series. In 1969, I found crystals and broken pieces of a very deep red-brown mineral associated with yellow OLIGOCLASE FELDSPAR in the Pueblo Park area of Catron County. I guessed this to be the iron-rich end member, HYPERSTHENE. Recent determinations by Paul Hlava, of Sandia Laboratories, identify this mineral as BRONZITE, the somewhat less iron-rich intermediate member of the ENSTATITE series. Northrop does not list this occurrence. The BRONZITE can be cut into cabochons with a weak catseye or faceted into tablets.

IDOCRASE - N.M. Probability - not very good. Best chance appears to be in the Fierro-Hanover and Pinos Altos mining districts of Grant County.

INDERITE (KURNAKOVITE) - N.M. Probability - near zero.

INDERITE is a magnesium borate not mentioned by Northrop.

IOLITE (CORDIERITE) - N.M. Probability - not very good as faceting rough.

Best chances are: 1) in a gully southeast of the Merrimac mine, Organ and South Canyon mining districts of Dona Ana County, 2) not far from the Harding Mine in Taos County (Montgomery, 1953). Coloradoans, ask me about four prospects in western Colorado!

JADEITE - N.M. Probability - very low.

Northrop questions a report of JADEITE in the Jicarilla mining district of Lincoln County (F. A. Jones, 1904).

KORNERUPINE - N.M. Probability - near zero.

Northrop lists no reported finds of KORNERUPINE in New Mexico.

KYANITE - N.M. Probability - good.

Best chances are: 1) in the Bromide No. 2, Ojo Caliente No. 1 and Petaca mining districts of Rio Arriba County - very large crystals were mined in quantity - no statements of clarity or color. 2) Glenwoody, Hondo Canyon, Picuris and Red River mining districts - broad, bladed fans of large crystals.

LABRADORITE - (see **FELDSPAR**).

LAZULITE - N.M. Probability - not good for faceting rough.

Best chance is the South Canyon mining district of Dona Ana County, in Rucca Canyon north of the east end of Soledad Canyon (Dunham, 1935 - 36).

LEGRANDITE - N.M. Probability - poor.

Northrop does not mention this mineral, which has been mined in Mexico.

***LEPIDOLITE** (a MICA) - **N.M. Probability -** good.

Best chance is in the dumps of the Harding Mine in Taos County. Vaguely crystalline-appearing lumps to 1/2 inch are occasionally found. They are sub-transparent, deep raspberry-colored, waxy. These may be pseudomorphs. It should be noted that much of the pink MICA of the Harding Mine is not LEPIDOLITE but ROSE MUSCOVITE.

LEUCITE - N.M. Probability - only fair.

The best chance seems to be near Todilto Park in McKinley County.

***LINARITE - N.M. Probability -** only fair for faceting rough but the best chance known. Crystals have been faceted.

A very rare mineral found in some quantity in the mines southeast of Bingham in the Hansonburg mining district of Socorro County. Most specimens are only a bright blue "sugaring" of tiny crystals, but very occasionally a crystal has been found large enough to yield a small faceted stone.

LUDLAMITE - N.M. Probability - near zero.
Northrop mentions no LUDLAMITE in New Mexico.

MAGNESITE - N.M. Probability - poor.
Best chances are: 1) Several locations in the White Sands Missile Range east of Las Cruces in Dona Ana County, 2) on a steep hillside west of Ash Creek, two miles above its junction with the Gila River and about 30 miles north of Lordsburg in Grant County. All reported material appears amorphous and unsuited for faceting.

MARCASITE - (see **PYRITE**).

MICROLITE - (often radioactive) -
N.M. Probability - fair.
Best chances are: 1) in the Pidlite deposit of the Rociada mining district in Mora County. Reportedly to 3/8 inch in honey-yellow to yellow-brown octohedrons. 2) Honey-yellow crystals from the Harding Mine in Taos County. Crystals may be large enough to facet but opaque or very fractured. The Harding mine is, supposedly, the largest MICROLITE ore body in the world.

MOLDAVITE, TEKTITE, etc. -
A stray obsidian-like rock of extraterrestrial or meteor impact origin - might be found in New Mexico but not likely. Only a real expert can make a determination between a TEKTITE and the ubiquitous Apache tear-type obsidians. (Technically speaking, all MOLDAVITES are from Moldavia.)

***MONTICELLITE - N.M. Probability -** poor.
The only possibility seems to be in the Tres Hermanas mining district of Luna County where it is associated with SPURRITE in limestone (field notes of Robert Balk, N.M. Bureau of Mines and Mineral Resources, via A. Rosenzweig, May 1957). Small crystals and grains reported are probably too small to permit faceting.

NATROLITE - N.M. Probability - low for faceting rough.
Best chances are: 1) in several places in the Jemez Mountains region of Sandoval County, particularly the Valle Grande area, 2) in vesicles (gas bubble holes) in the basalts of Canjilon Hill, three miles north of Bernalillo in Sandoval County.

OBSIDIAN - (Technically a rock, not a mineral) -
N.M. Probability - certain.
OBSIDIANS are found in many parts of New Mexico, particularly west of the Rio Grande. In most occurrences, the OBSIDIAN is sub-transparent at best, but there are also a few sources of nearly transparent rough. Best chances are: 1) in the Jemez Mountains of Sandoval County at the Tent Rocks about four miles northwest of Cochiti Pueblo on National Forest Road 266. The tears are quite transparent but small - to 1/4 inch. 2) In the Jemez Mountains on the same road noted in (1), about 12 miles northwest of Cochiti Pueblo and about 3/4 mile north of the old Bear Canyon ranch site. More or less transparent “tears” to 1 1/2 inches can be found in the roadbed and in shallow diggings (for PERLITE) on the east side of the gulch. About 10% of these “tears” contain flow-oriented, glittering, blue, inclusions of unknown composition. Properly oriented and cut, these obsidians make spectacular gems. NOTE! We are investigating these inclusions. Under the microscope, they appear to be perfect hexagonal plates with strange, internal star-like markings. We are trying for Microprobe examination to determine the nature of these inclusions.

OLIGOCLASE - (see **FELDSPAR**).

OLIVINE - (see, also, **PERIDOT**).

OPAL - N.M. Probability - fair if you care to investigate old records.
Best chances are: 1) in Dona Ana County southwest of Hatch - hint: see articles by Mildred Sanders in early issues of the Lapidary Journal, 2) high on the north fork of Percha Creek north of Kingston in Sierra County - reported as orange to red transparent opal, see M. Sanders, 3) in the Jemez Mountains of Sandoval County, off Forest Road 266 about five miles northwest of Cochiti Pueblo and 1/2 mile north of Tent Rocks. White base and transparent opal was reported mined here around 1900. The actual site was on the west side of Colle Canyon 1/4 mile north of its junction with Peralta Canyon. 4) In the Central and Burro Mountains mining districts of Grant County, particularly near Fort Bayard - “precious opal of good quality.”

PERICLASE - N.M. Probability - fair.
The only chance seems to be in the South Canyon mining district of Dona Ana County - Dunham, 1936, reported PERICLASE as “fairly abundant in the large BRUCITE marble masses south of the ridge.”

PERIDOT - (see, also, **OLIVINE**).
N.M. Probability - quite good.

Best chances are: 1) in Kilborne Hole and other similar features near Afton in Dona Ana County and near the Mexican border - small but good greens. 2) In McKinley County in the Red Lake, Green Knobs, Todilto Park and Zilditloi Mountain areas - some good rough. 3) Rumor has it that good finds are presently being made at a volcanic neck south of Engle in Sierra County. 4) An occasional find is possible in a number of other counties where large phenocrysts have been noted in volcanic rocks.

PETALITE - N.M. Probability - poor.
PETALITE has been reported but not verified in the Glenwoody, Harding Mine, Hondo Canyon and Picuris mining districts of Taos County.

PHENACITE or **PHENAKITE -**
N.M. Probability - very low.
PHENAKITE has been reported but not verified from the Petaca mining district of Rio Arriba County.

PHOSGENITE - N.M. Probability - very low.
A few fine crystals to 1 1/2 or two inches long were found, long ago, at the old Stevenson-Bennett mine about a mile south of Organ in Dona Ana County. The mine, itself, has recently been open-pitted and operated as a building stone quarry.

PHOSPHOPHYLLITE - N.M. Probability - near zero.
Northrop does not mention this mineral.

PLAGIOCLASE - (see **FELDSPAR**). - All sodium/calcium Feldspars.

POLLUCITE - N.M. Probability - near zero.
Northrop does not mention this mineral.

PREHNITE - N.M. Probability - fair.
Best chance is two locations in the Nogal mining district of Lincoln County; 1) about 6 1/2 miles southeast of Carrizozo as pale bluish-green botryoidal masses in cavities and 2) a locality 1 3/4 miles northwest of Nogal.

PROUSITE - N.M. Probability - poor.
Best chances appear to be: 1) in the Black Hawk, Georgetown and Pinos Altos mining districts of Grant county, 2) in the Kingston and Lake Valley mining districts of Sierra County. PROUSITE was mined in these areas long ago but almost all of this valuable silver ore went to the refineries.

***PSILOMELANE - N.M. Probability -** certain.
The ore, PSILOMELANE, is almost always a combination of several oxides of manganese. A number of years ago, a highly siliceous PSILOMELANE was imported from Mexico and cut into interesting, banded cabochons. The New Mexico PSILOMELANE has little silica and less banding. It can be faceted into bright, metallic tablets. The best location is the Luis Lopez Mining district about 12 miles southwest of Socorro.

PYRITE and **MARCASITE -**
N.M. Probability - certain.
PYRITE or MARCASITE is found in almost every mining district in New Mexico. The two are chemically identical minerals with a differing crystal habit. MARCASITE tends to form in coal veins and other high-carbon rocks; PYRITE usually accompanies metallic ores. Either mineral may be faceted into glittering tablets. Beware of "PYRITE" of nearly silver color. It may be ARSENOPYRITE, which may be poisonous to work with or wear. One easy-to-reach source of PYRITE is some prospects north of Highway 70 and about 1/2 mile east of Organ in Dona Ana County.

PYROXMANGITE - N.M. Probability - poor.
Northrop does not mention this mineral.

QUARTZ - N.M. Probability - certain.
Northrop names 70 varieties of QUARTZ found in New Mexico. Most of these varieties are cryptocrystalline, i.e., made up of interlocking, fibrous crystals - agates and jaspers are examples. Many cryptocrystalline QUARTZ stones can be faceted as interesting tablets, but in the interest of brevity, I shall mention only the more outstanding sources of transparent crystalline QUARTZ. Some good possibilities are: 1) in the Mogollon, Taylor Creek and Wilcox mining districts of Catron County (see Ferguson, 1927, Alfredo, 1951 and Rocks and Minerals, v. 27, 1952, p. 35). Also in Catron County, "an area five miles wide by 30 miles long near Grass Lake in the southern San Augustin Plains, crystals, casts and banded agate," (news item, 1947). 2) "Pecos Diamonds" in GYPSUM beds for 100 miles along the Pecos River in Chaves, De Baca and Eddy Counties - sharp, doubly-terminated but seldom clear crystals. A particularly good local is about five miles east of Ramon in De Baca County. 3) in Baldy, Cimarroncito and Elizabethtown mining districts and widely scattered through the Cimarron Range in Colfax County. 4) Widespread in virtually all the mining districts of Dona Ana

and Grant Counties. Particularly fine faceting rough (colorless, smoky, amethystine and smoky-amethystine) is found at the SANIDINE MOONSTONE claims in Rabb Canyon, Grant County). 5)In virtually all the mining districts of Rio Arriba, San Miguel, Santa Fe, Sierra and Taos Counties.

AMETHYST has been noted in a number of counties as follows: 1) in the Mogollon mining district of Catron County, 2) at the Ben Nevis mine in the Organ mining district of Dona Ana County, 3) in the Chloride mining district (abundant), Kingston and Tierra Blanca mining districts of Sierra County, also recently reported from somewhere near Wall Lake in western Sierra County, 4) in the Council Rock, Ladron, San Jose and San Lorenzo mining districts of Socorro County, also an interesting AMETHYST occurrence in a decayed FELDSPAR (clay) dike on the lower, southwest slopes of Ladron Peak, also in Socorro County. This one was once well-know to university students at Socorro but has, apparently, passed from "common knowledge". Crystals were clear, stubby, to 1 1/2 inches across. Only the tops were amethystine, never deep purple.

Smoky QUARTZ of fine quality and considerable quantity has been taken, in the past few years, from from a long, slender occurrence on the north slope of Sierra Blanca Peak southeast of Carrizozo and north of Ruidoso in Lincoln County. A heavy incrustation must be removed from these specimens. Many are of museum quality. The entire length of this site is, apparently, a National Wilderness or Primative Area. Federal authorities have confiscated several "for sale" collections and threatened severe fines, claiming the crystals are a "national treasure". A considerable controversy still simmers over collecting in this area. As I understand, surface collecting for one's private collection is okay, but digging or collecting for sale is bad.

REALGAR - N.M. Probability - near zero.
Northrop does not list REALGAR as a New Mexico mineral.

RHODIZITE - N.M. Probability - near zero.
Northrop does not mention RHODIZITE in New Mexico.

RHODOCHROSITE -
N.M. Probability - poor for faceting rough.
Best chance appears to be at the Comstock and Lady Franklin mines in the Kingston mining district of Sierra County.

RHODONITE -
N.M. Probability - poor for faceting rough.
Best chance is the same locations noted for RHODOCHROSITE.

RUTILE - N.M. Probability - near zero.
Rutile appears as microscopic or very tiny crystal threads in a number of New Mexico mines and prospects, but there is no mention of anything of facet-able size.

SCAPOLITE - N.M. Probability - low.
Best chance seems to be near Sylvanite in the Sylvanite mining district of Hidalgo County. There is a large deposit of SCAPOLITE just across the border from Sylvanite into Texas. The location is in Fusselman Canyon, the Franklin Mountains, south of Las Cruces and north of El Paso.

SCHEELITE -
N.M. Probability - possible but not very likely in faceting size and quality.
Best chances are: 1) in the Organ mining district of Dona Ana County at the Memphis, Memphis King and Merrimac mines. (I have seen rich, ore-grade SHEELITE claimed to come from just inside the White Sands Proving Grounds.) 2) In the Bound Ranch, Carpenter and Eureka mining districts of Grant County, 3) in the Apache No. 2, Fremont and Sylvanite mining districts of Hidalgo County. The Granite Pass prospect south of Sylvanite looks like a best bet. 4) in a deposit near Dolores in the Ortiz Mountains, which is in the Old Placers mining district of Santa Fe County. 5) in the Grandview mining district of Sierra County - "museum specimens". SCHEELITE has also been reported from the Iron Mountain No. 2 mining district of Sierra County.

***SELENITE - N.M. Probability -** certain.
This mineral is evident in almost every county in New Mexico. It is the crystalline form of GYPSUM and might be found at any GYPSUM location. It is extremely soft, easily cleavable and and partially water-soluble. It offers a real challenge to the competitive faceter.

SERPENTINE -
N.M. Probability - not very good for faceting rough.

Best chance seems to be in the "Ricolite deposit" which is up Ricolite Gulch about six miles northeast of Red Rock post office and west of the Gila River in western Grant County. The two main deposits produce great quantities of banded decorative material. A third deposit 1/2 mile west produces a sulfur-yellow SERPENTINE with needles of ASBESTOS. It may provide the best chance of faceting rough.

***SERPIERITE -**
N.M. Probability - not good but the best U.S. chance extant if the minerals found prove to be SERPIERITE.

The possible location is near Bingham in the Hansonburg mining district of Socorro County. Northrop (1959) indicates that a sky-blue mineral found with LINARITE had not been positively identified as SERPIERITE. I have no later information.

SIDERITE - N.M. Probability - poor.

SIDERITE has been verified at a fairly large number of New Mexico locations, but there is no indication of anything approaching transparency. As good a possibility as any might be in nodules found along Galisteo Creek near Galisteo village in Santa Fe County.

SILLIMANITE - N.M. Probability - only fair.

Best chance seems to be in the Manzano Mountains of Torrence County where it may be found in laths 1/4 inch wide by 2 inches long. The SILLIMANITE is in a schist, and the area may be large, since Northrop specifies no particular site.

SINHALITE - N.M. Probability - low.

Northrop makes no mention of SINHALITE, but recognition of this mineral as a species separate from PERIDOT may have occurred after publication of "Minerals of New Mexico". There is, therefore, a possibility that some of the brownish Red Lake and Green Knobs "PERIDOT" is, actually, SINHALITE.

SMITHSONITE - probability the best in the U.S.

The translucent to nearly transparent variety called HERRERITE was found in at least two mining districts in New Mexico. Best chances are: 1) in the Stevenson-Bennett mine about a mile south of Organ and a small series of prospects about 1/2 mile east of Organ in Dona Ana County, 2) just south of the village of Magdalena in the old Kelly and Graphic mines, the Magdalena mining district of Socorro County. Vast tonnages of gem- and specimen-quality HERRERITE were shipped and milled as zinc ore. Neither mine can be entered at present, but occasional small finds are made on the dumps. Either mine may be open sporadically, but entry is extremely dangerous. Mining was done in fractured limestone, and the mines have been long flooded.

SODALITE - N.M. Probability - near zero.

Microscopic grains have been identified in rocks, but there is no promising New Mexico location.

SPHALERITE - N.M. Probability - certain.

Northrop lists a large number of SPHALERITE locations in New Mexico. Unfortunately, most of our SPHALERITE is very dark to nearly opaque, and even the best pieces will yield only small stones. Best chances appear to be: 1) In the Modoc, Organ and Rincon mining districts of Dona Ana County, 2) all of the many mining districts in the area around Silver City, Grant County, 3) all of the many mining districts around Hatcheta and Lordsburg in Hidalgo County, 4) in the Cerrillos mining district of Santa Fe County, 5) all of the many mining districts of Sierra County. Of the above possibilities, I would select the old mines and prospects of the Cerrillos mining district a few miles nearly due north of the town of Cerrillos and just south of the ancient Indian turquoise pit. A second high probability is the old mines in the Hermosa mining district of Sierra County. Both locations seem to yield honey-colored SPHALERITE.

SPHENE - N.M. Probability - poor.

There are several SPHENE locations in New Mexico, but most specimens are microscopic to 3.0 mm maximum size.

The best chances are: 1) in the Picuris mining district at a locality described as being several miles east of the Harding Mine in Taos County, 2) in the Rabb Canyon moonstone prospects of Grant County (see sanidine moonstone feldspars). Tiny, yellow bits of SPHENE are abundant in the sands, and an occasional wedge-shaped crystal to 3/4 inch long is found near the prospects. These large crystals are invariably nearly opaque.

SPINEL - N.M. Probability - fair.

Northrop lists no crystals large enough to facet, but I have seen shiny, black, opaque crystals (PLEONASTE variety) to 1/2 inch. These are said to come from a location several miles east to southeast of Truth Or Consequences in Sierra County.

SPODUMENE - N.M. Probability - very poor.

SPODUMENE in huge, opaque, lath-like crystals has been mined as lithium ore at the Harding Mine in Taos County and elsewhere. There is no indication of translucent or transparent faceting material, however.

STIBIOTANTALITE - N.M. Probability - near zero.
Northrop does not mention this mineral.

***STILBITE** - (A ZEOLITE) - **N.M. Probability -** good.
This mineral is probably much more widespread than New Mexico records indicate. Several ZEOLITES form in the cavities of volcanic rocks, particularly rhyolite and basalt. One possibility is in the volcanic rocks surrounding the Rabb Canyon moonstone prospects in Grant County.

SULFUR - N.M. Probability - fair.
Best chances are in several locations in the vicinity of Jemez Springs, Battleship Rock and La Cueva Junction in Sandoval County. Two possibilities are the seepage springs just downstream from Battleship Rock (about 11 miles north of Jemez Springs) and a SULFUR springs location a mile or two northeast of La Cueva Junction.

***THOMSONITE** - (A ZEOLITE) - **N.M. Probability -** fair.
This rare gem mineral is normally considered a cabochon material. It does, however, occasionally occur as a transparent mineral.
There are these possible locations: 1) in the Nogal mining district of Lincoln County southeast of Carrizozo and "is common around Cub Mountain and Church Mountain where it occurs as spherulitic aggregates and radiating sheaves up to 3 inches in diameter, also with PREHNITE 1 3/4 miles northwest of Nogal." 2) in an andesite flow on the west side of the Valle del Ojo de la Parida, about ten miles north-northeast of Socorro in Socorro County, also in bentonitic tuff along the north side of Blue Canyon west of Socorro.

TOPAZ - Probability good.
Three locations in Taylor Creek mining district of Sierra County have produced clear, colorless topaz large enough for small gems. Several other locations have produced very tiny crystals or large, barely translucent masses. The Taylor Creek possibilities are: 1) two very close together prospects at the south 1/2 of section 22, township 10 south, range 11 west. These are only a few hundred yards off paved State Highway 52, leading to Beaverhead in the Gila Wilderness. 2) A third location is about seven or eight airline miles southeast of the other two locations at the west base of Round or Maverick Mountain some 1,300 yards north of Main Diamond Creek. I have two clean crystals from this location. The best one is about 5/8 inches long by 1/4 inches wide by 3/16 inches thick.

TOURMALINE -
N.M. Probability - for opaque black (SCHORLITE) good, poor for green or pink transparent material.
The best location for SCHORLITE appears to be 1.5 miles east of Picuris in Taos County where large, black crystals to 6 inches long have been reported. Northrop lists several other SCHORLITE locations, but most of these seem to be in the form of masses of slender needles. A possibility for transparent, colored TOURMALINE is the Pidlite deposit in the Rociada mining district of Mora County. A few pink to pale green crystals 1/4 to 2 inches long were reported (Jahns, 1953b). I have a way-out long shot for pink TOURMALINE. About 30 years ago, my two sons and I were following the gas pipeline road which then skirted Mesa Prieta about 15 miles southwest of San Ysidro. At the point closest to the abrupt rise of Mesa Prieta and about 15 miles southeast of Cabezon Peak, we stopped to check surface debris. Despite geological survey claims that the region is volcanic with an overlay of sedimentary material in some places, we found a considerable amount of pink granite tending toward pegmatite. And one son picked up two small crystals of pink TOURMALINE that appeared identical to Pala California material. The area is now private property "KEEP OUT" status, and the pipeline and road no longer skirts Mesa Prieta. The location is in Sandoval County. I theorize that the Nacimiento Range granites lie only a short distance below the surface at this point.

TREMOLITE - N.M. Probability - poor.
Northrop lists several TREMOLITE locations but all appear to be relatively loose masses of needle-like or hair-like crystals. The best chance may be: in the Capitan mining district of Lincoln County at the west end of West Capitan Mountain where it is noted as appearing in some quantity in limestone.

***TURQUOISE - N.M. Probability -** very good.
TURQUOISE is not, normally, considered a faceting material. It can, however, be faceted into interesting tablet forms as is done with several other opaque minerals. There are many New Mexico locations. Best chances are: 1) in the Burro Mountains, Eureka, Santa Rita, and

White Signal mining districts of Grant County, 2) in the Orogrande mining district of Otero County, 3) in the Cerrillos mining district of Santa Fe County, 4) any copper mining area may, on occasion, produce turquoise.

VIVIANITE - N.M. Probability - very poor.
VIVIANITE in the form of ONDONTTOLITE (fossil materials impregnated with VIVIANITE) have been noted in the Nacimiento Mountains mining district of Sandoval County, but there is no reason to believe that facet-able material is to be found.

***WHEELERITE - N.M. Probability -** fair.
This mineral is a fossil resin closely related to amber and may be found in the same locations as amber (see listed amber locations).

WILLEMITE - N.M. Probability - almost zero.
Northrop notes significant amounts of WILLEMITE, a rare zinc ore, at a number of New Mexico locations. The largest crystals seen, however, did not exceed 2.0 millimeters. These came from the Hillsboro mining district in Sierra County (Pough, 1941, p. 96).

WITHERITE - N.M. Probability - almost zero.
Northrop lists three reports of WITHERITE in New Mexico, but these were of insignificant amounts.

WULFENITE - N.M. Probability - fair.
Best chances are: 1) in the Bear Canyon and Organ mining districts of Dona Ana County - the old Stevenson-Bennett mine just south of Organ was a good source but is now being worked as a source of rock for building purposes. 2) In the Caballo Mountains, Hermosa, Hillsboro, Iron Mountain No. 2, Lake Valley and Macho mining districts of Sierra County. Tabular museum specimens to 1.0 inch wide were once plentiful at the Miner's Dream claim 2 1/2 miles northeast of Hillsboro (Jones, E.L., Jr., 1919).

ZEOLITES - These consist of ANALCIME, CHABAZITE, HEULANDITE, NATROLITE, STILBITE and THOMSONITE. Where appropriate, these minerals have been separately listed on preceding pages. In New Mexico, the ZEOLITE mineral group is probably more plentiful than reports would indicate.)

ZINCITE - N.M. Probability - near zero.
Northrop lists no significant New Mexico sources of ZINCITE.

ZIRCON - N.M. Probability - near zero.
Northrop lists a number of New Mexico locations that yield evidence of ZIRCON, but the mineral bits have always been microscopic.

***ZOISITE - N.M. Probability -** very low for faceting material.
Northrop lists two possible sources of the pink to rose red variety, THULITE. These are: 1) in prospects in the cliffs just south to southeast of Pilar in Taos County, 2) in a bed about 12 inches thick about 1/2 mile north and a mile northeast of the Harding Mine in Taos County. Massive pink THULITE in pale green EPIDOTE was specified (Montgomery, 1953).

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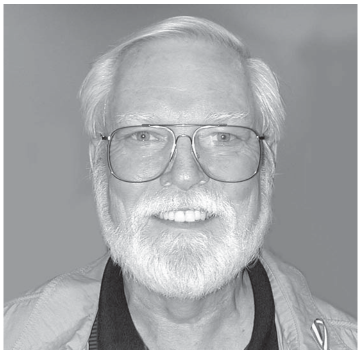
New Mexico Facetor

Horizontal or Vertical?

Whenever possible, faceting laps should be stored in containers that will protect them from dust contamination. Many faceters use the boxes laps often come in for storage. Others spend the extra dollars to get the plastic containers that do a better job of sealing out contaminants. The old style Dyna laps that many of us have come in nice paper sleeves that generally work well to keep out the dust. But once the laps are in some kind of protective container, how do you store your laps? I've seen laps stored neatly and vertically in various types of compartmented storage units, and I've seen similar horizontal cabinets. I happen to have both types of storage for my laps. Now, you're probably thinking, so what, vertical, horizontal, does it make a difference? Well, for many laps, it really makes no difference. But for one type of lap it can make a big difference. Any lap that is essentially a topper glued to a base lap should be stored in a horizontal position, especially if they're kept in a warm room or if you live in a hot climate. If they're stored vertically over a period of time and not used regularly, the topper can creep very slightly throwing the lap off center and out of balance. I've actually seen laps that could no longer fit on the machine because of this.

Facet Designer's Workshop



By Ernie Hawes

Sometimes I like to try different variations when I'm designing. My friend in Scotland, Danny Hargreaves appears to like to do that, too. Several of the designs presented in this issue are variations on a theme. Often, when I do that, I won't care for some and toss them, but sometimes I find that I like more than one, which is the case this time. I've been trying to create some designs that will work in garnet that is somewhat on the darker side, rough that barely passes the white paper test. Unfortunately, a lot of garnet is so dark that it's really not worth cutting. Some is OK for cabochons, but too dark for faceting. Some is in between. And it's that in between rough that I've been trying to come up with designs that can salvage that type of rough. So far, I've not been totally successful, but a few will work to a degree. All of them have low bar type crowns. But more on that later.

Danny Hargreaves creates some of the most unusual designs that I've come across, and in this issue he has contributed several that play on the same theme. I like to design for low RI materials with the idea that if a design works in quartz, its angles can usually be transposed to work in higher RI materials. Danny, on the other hand creates most of his designs for corundum and doesn't seem to have much interest in cutting low RI rough.

Anyway, the designs that I've selected for this issue should provide something of interest to any faceter, from the novice to the advanced cutter. Most are suitable for the novice cutter, while a few call for extra care, especially to avoid over cutting.

The first three designs are the series of bar patterns for garnet.

Simple Bar for Garnet I

Small, elongated stones probably will work best in this design. The uncomplicated crown and simple step pavilion are ideal for those small dark garnet pebbles.

Simple Bar for Garnet II

Essentially the same pavilion is used in all three of the garnet bar designs. However, this design has more bars on the crown and getting them to be all the same size can be a bit difficult. (When I call a design simple, I don't necessarily mean easy. Simplicity can be very demanding to get it exact.)

Simple Bar for Garnet III

This design takes the concept a little bit further by slightly modifying the outline. Difficulty is about the same as ***Simple Bar for Garnet II*** with a few facets added.

The next five designs are Danny Hargreaves's creations and are variations on a round spiral theme. You will notice in various ones of them, facets that are extremely small. They don't start out that way, but facets that follow in the cutting sequence reduce the size of some of the preceding facets significantly, and great care is required to avoid cutting the away completely. They must be cut is the rough cutting stage, but need only be addressed again in the prepolish stage or perhaps just in the final polishing of the stone.

Elizabeth

A complex spiral pattern, ***Elizabeth*** will take time to cut its many facets, and care must be given to get good meets and to avoid over cutting. Other than that, it's really not a difficult design to cut, and the effort will give you a beautiful stone.

Emma

Continuing the spiral concept, ***Emma*** opens the table wide to give you a view of the almost hypnotizing spiral within. Not as complicated as ***Elizabeth***, ***Emma's*** only complication is the table. Being large, it may be difficult to polish.

Gail

If you haven't noticed by now, Danny likes to name his designs for relatives and lady friends. Not a bad way to endear oneself.

Be very careful with the crown on this design. If you accidentally over cut any facets, you will have to re-cut the entire table. However, the scintillation in a stone cut in this pattern is outstanding.

Layla

At first glance, ***Layla*** almost looks haphazard, but it's not. It does have fewer and larger facets, making it one of the easier designs in this series. Nonetheless, it cuts quite an attractive stone.

Lucy

The last design in this series probably should only be cut in fairly large material. The last two rows of facets before the table would probably get lost in smaller stones, and will require some patience to get the facets exact. As with the other designs in this series, it will cut a beautiful stone, one that you should be proud to show off, or present to family members, friends, of clients.

The last four designs in this issue are all different, and while they may appear to be difficult, for the most part, they are fairly straight forward to cut, and will reward you with beautiful stones.

Brilliant Mixed Square Cushion II

The Cullinan diamonds are famous not only for their great size, but also display great beauty. In this variation on one of the Cullinan gems, I've chosen to give the design a deep step cut pavilion. This mixing of step and brilliant facets gives an extra scintillation effect. If you haven't cut one, this is a good design to give it a try. If you don't want a deep pavilion, you can easily reduce the number of rows, starting with the one next to the girdle. However, I recommend having at least three rows.

Square Cross II

Designs with cut corners are always problematic. If you don't cut the corners to the exact correct size, several of the facets will have to be cut at different angles than those specified. I've eliminated that problem in this pattern by creating a preform. However, a preform requires extra depth that your rough may not have, or if it's expensive rough, you don't want to remove any more than necessary. It is possible to cut this design without a preform, but care must be taken to cut the outline to the correct proportions, else you'll have to modify angles as you go. On the other hand, if you've got inexpensive rough and enough of it, this is an easy design to cut and will give you a beautiful stone.

Eva's Star

There are not many pentagonal shaped designs available, and many of those that are available are meant to show a five pointed star in the pavilion. Danny's design is in that same vein, but shows the star with quite a bit of scintillation around it. The star may be polished or it may be left frosted. If you choose frosted, I would not cut the star any finer than with a 600 grit lap.

Easy Cushion Triangle

Faceters who shy away from cushion cuts as being difficult will be pleasantly surprised by this design. Getting the girdle facets to be the right width can be difficult, but if you follow the meetpoint sequence, this design is a piece of cake. I especially encourage beginning faceters to give this design a try after they've cut a few round brilliants.

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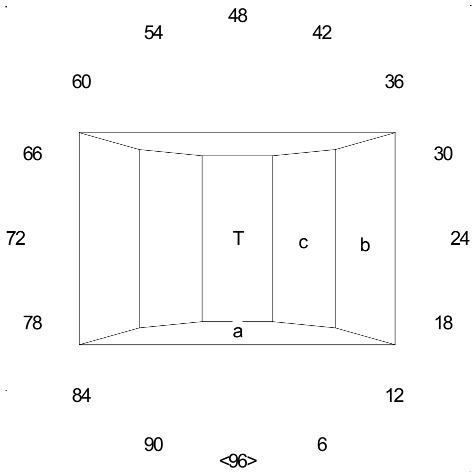
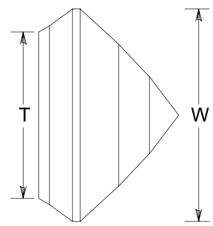
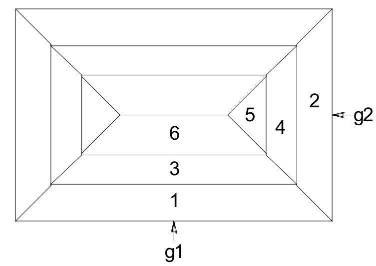
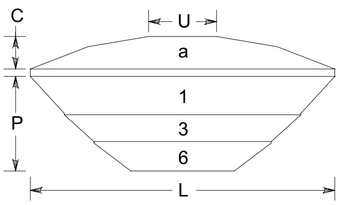
I want to thank Danny Hargreaves for giving his permission to publish several of his designs. I would like to publish more designs by other faceters, and encourage anyone interested to send them to me. I prefer receiving them in the GemCad format but can also use PDF files. I already have a start on new designs for next year and look forward to getting more as well as creating some new designs myself.

Questions or comments about any of the designs presented in the New Mexico Faceter's Journal are welcome. If you would like to have us publish pictures of stone you've cut in any of these designs, you can e-mail jpeg or raw images to me at faceter@q.com. Happy Faceting





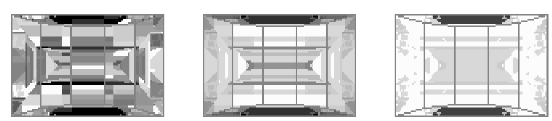


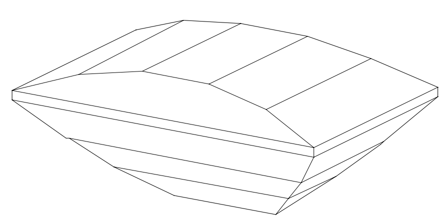


Simple Bar for Garnet I

By Ernie Hawes

Angles for R.I. = 1.720
19 + 4 girdles = 23 facets
2-fold, mirror-image symmetry
96 index
L/W = 1.500 T/W = 0.780 U/W = 0.334
P/W = 0.469 C/W = 0.157
Vol./W³ = 0.504
Average Brightness: COS = 77.4 % ISO = 88.5 %



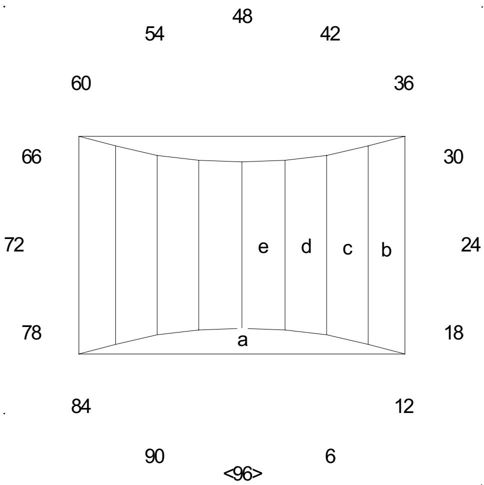


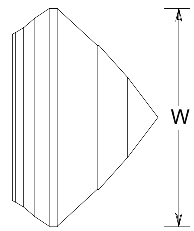
PAVILION

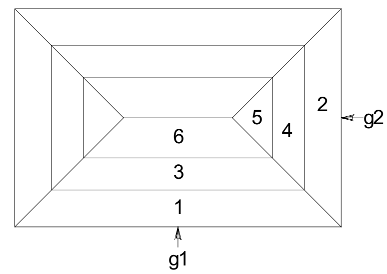
g1	90.00°	96-48
g2	90.00°	24-72
1	48.00°	96-48
2	48.00°	24-72
3	43.00°	96-48
4	43.00°	24-72
5	38.00°	24-72
6	38.00°	96-48

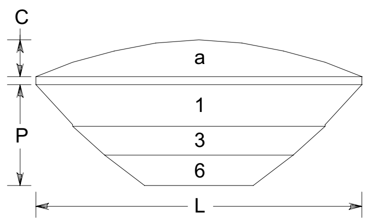
CROWN

a	55.00°	96-48
b	21.00°	24-72
c	9.00°	24-72
T	0.00°	Table





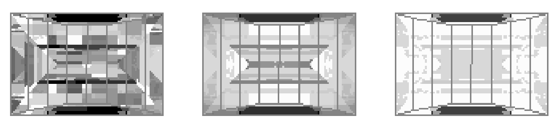




Simple Bar for Garnet II

By Ernie Hawes

Angles for R.I. = 1.720
22 + 4 girdles = 26 facets
2-fold, mirror-image symmetry
96 index
L/W = 1.500
P/W = 0.469 C/W = 0.167
Vol./W³ = 0.503
Average Brightness: COS = 77.3 % ISO = 88.7 %

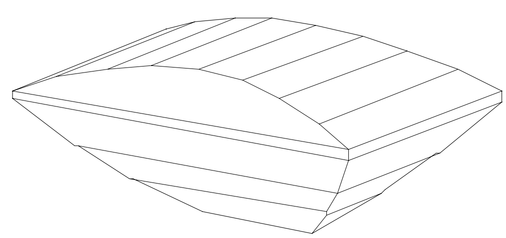


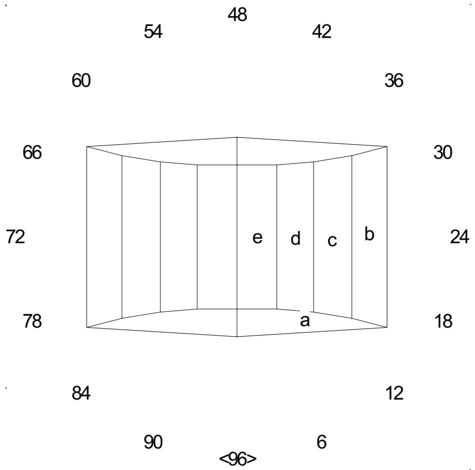
PAVILION

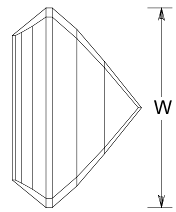
g1	90.00°	96-48
g2	90.00°	24-72
1	48.00°	96-48
2	48.00°	24-72
3	43.00°	96-48
4	43.00°	24-72
5	38.00°	24-72
6	38.00°	96-48

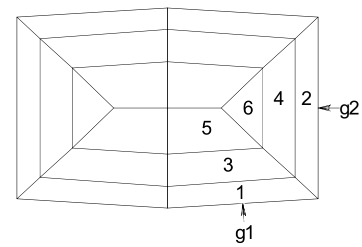
CROWN

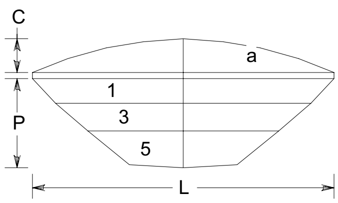
a	55.00°	96-48
b	21.00°	24-72
c	16.00°	24-72
d	10.00°	24-72
e	4.00°	24-72







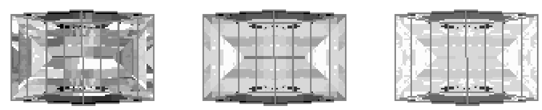


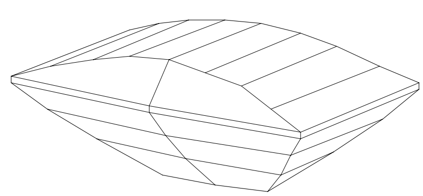


Simple Bar for Garnet III

By Ernie Hawes

Angles for R.I. = 1.720
30 + 6 girdles = 36 facets
2-fold, mirror-image symmetry
96 index
L/W = 1.500
P/W = 0.445 C/W = 0.172
Vol./W³ = 0.451
Average Brightness: COS = 74.2 % ISO = 83.0 %



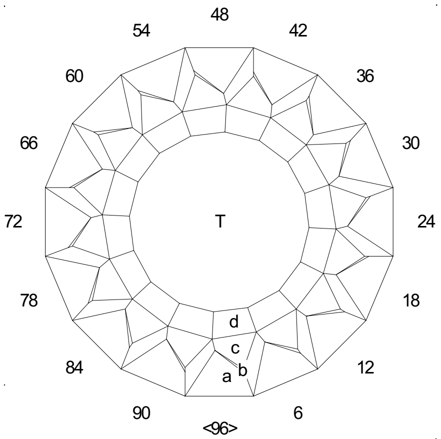


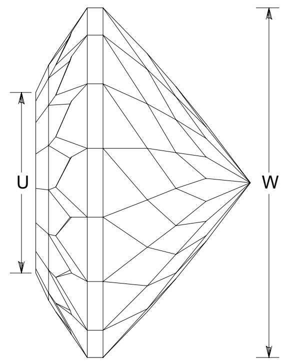
PAVILION

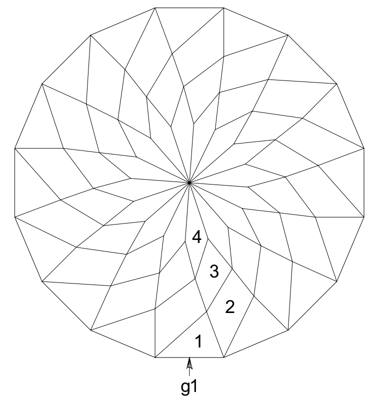
g1	90.00°	01-47-49-95
g2	90.00°	24-72
1	48.00°	01-47-49-95
2	48.00°	24-72
3	42.00°	01-47-49-95
4	42.00°	24-72
5	38.00°	01-47-49-95
6	38.00°	24-72

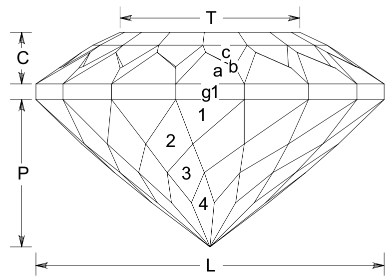
CROWN

a	51.00°	01-47-49-95
b	21.00°	24-72
c	16.00°	24-72
d	10.00°	24-72
e	5.00°	24-72





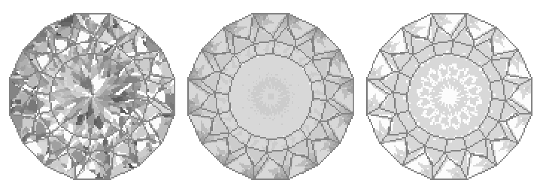




Elizabeth

copyright Danny Hargreaves

Angles for R.I. = 1.760
145 + 16 girdles = 161 facets
16-fold radial symmetry
96 index
L/W = 1.000 T/W = 0.522 U/W = 0.522
P/W = 0.424 C/W = 0.148
Vol./W³ = 0.229
Average Brightness: COS = 85.3 % ISO = 92.5 %

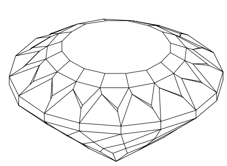


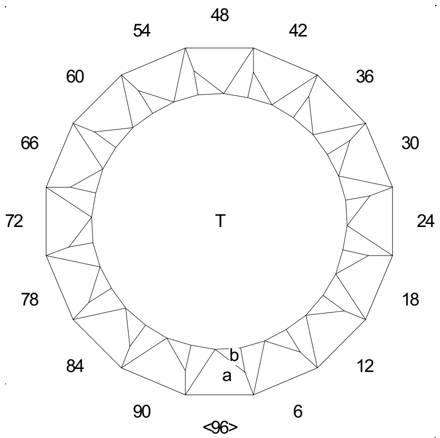
PAVILION

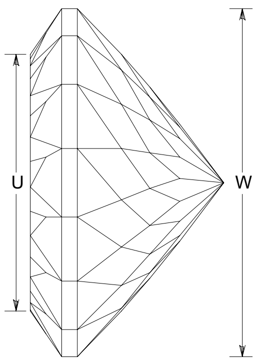
g1	90.00°	96-06-12-18-24-30-36-42-48-54-60-66-72-78-84-90
1	44.00°	96-06-12-18-24-30-36-42-48-54-60-66-72-78-84-90
2	42.00°	05-11-17-23-29-35-41-47-53-59-65-71-77-83-89-95
3	40.00°	04-10-16-22-28-34-40-46-52-58-64-70-76-82-88-94
4	38.00°	02-08-14-20-26-32-38-44-50-56-62-68-74-80-86-92

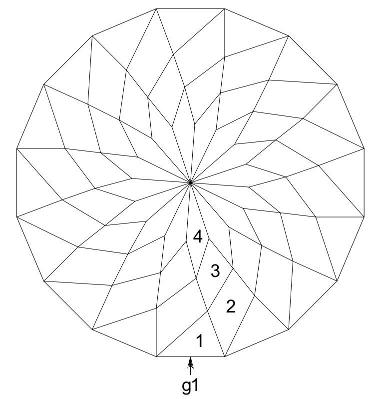
CROWN

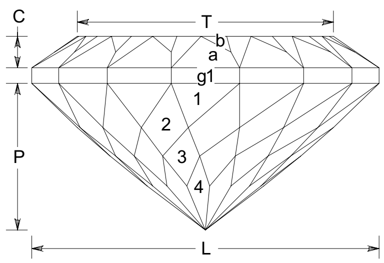
a	35.00°	96-06-12-18-24-30-36-42-48-54-60-66-72-78-84-90
b	33.00°	01-04-07-10-13-16-19-22-25-28-31-34-37-40-43-46-49-52-55-58-61-64-67-70-73-76-79-82-85-88-91-94
c	31.00°	02-08-14-20-26-32-38-44-50-56-62-68-74-80-86-92
d	26.00°	02-08-14-20-26-32-38-44-50-56-62-68-74-80-86-92
T	00.00°	Table







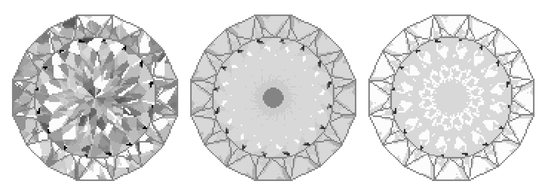




EMMA

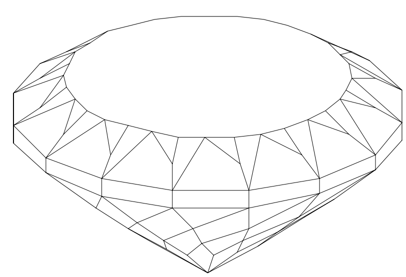
copyright Danny Hargreaves

Angles for R.I. = 1.760
113 + 16 girdles = 129 facets
16-fold radial symmetry
96 index
L/W = 1.000 T/W = 0.737 U/W = 0.737
P/W = 0.424 C/W = 0.092
Vol./W³ = 0.212
Average Brightness: COS =86.8 %   ISO = 93.0 %



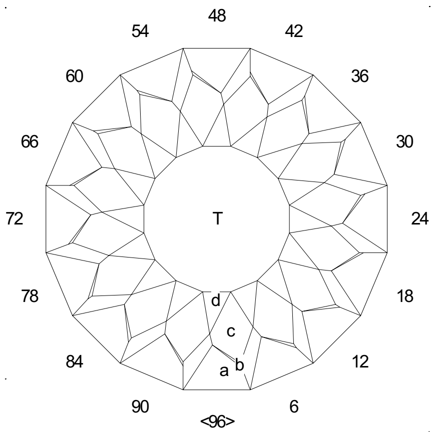
PAVILION

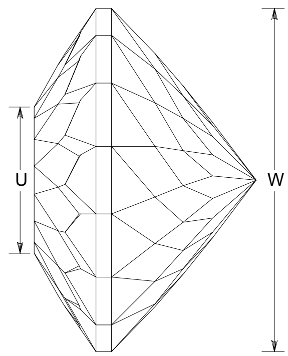
g1	90.00°	96-06-12-18-24-30-36-42-48-54-60-66-72-78-84-90
1	44.00°	96-06-12-18-24-30-36-42-48-54-60-66-72-78-84-90
2	42.00°	05-11-17-23-29-35-41-47-53-59-65-71-77-83-89-95
3	40.00°	04-10-16-22-28-34-40-46-52-58-64-70-76-82-88-94
4	38.00°	02-08-14-20-26-32-38-44-50-56-62-68-74-80-86-92

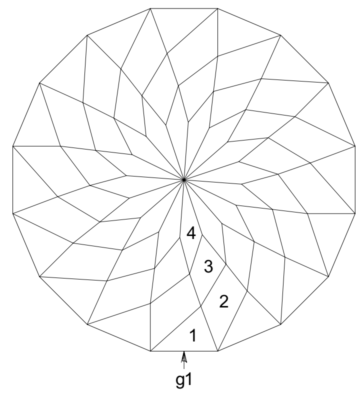


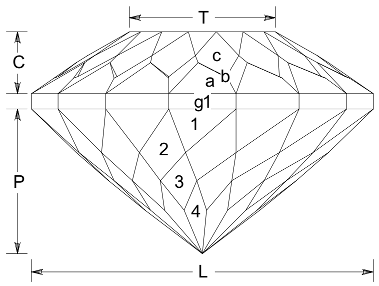
CROWN

a	35.00°	96-06-12-18-24-30-36-42-48-54-60-66-72-78-84-90
b	33.00°	01-04-07-10-13-16-19-22-25-28-31-34-37-40-43-46-49-52-55-58-61-64-67-70-73-76-79-82-85-88-91-94
T	00.00°	Table









Gail

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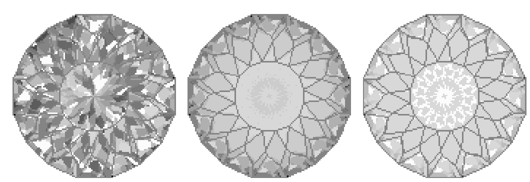
Angles for R.I. = 1.760
145 + 16 girdles = 161 facets
16-fold radial symmetry
96 index
L/W = 1.000 T/W = 0.426 U/W = 0.426
P/W = 0.424 C/W = 0.180
Vol./W³ = 0.236
Average Brightness: COS = 79.0 % ISO = 89.0 %



PAVILION

g1	90.00°	96-06-12-18-24-30-36-42-48-54-60-66-72-78-84-90
1	44.00°	96-06-12-18-24-30-36-42-48-54-60-66-72-78-84-90
2	42.00°	05-11-17-23-29-35-41-47-53-59-65-71-77-83-89-95
3	40.00°	04-10-16-22-28-34-40-46-52-58-64-70-76-82-88-94
4	38.00°	02-08-14-20-26-32-38-44-50-56-62-68-74-80-86-92

CROWN

a	35.00°	96-06-12-18-24-30-36-42-48-54-60-66-72-78-84-90
b	33.00°	01-04-07-10-13-16-19-22-25-28-31-34-37-40-43-46-49-52-55-58-61-64-67-70-73-76-79-82-85-88-91-94
c	31.00°	02-08-14-20-26-32-38-44-50-56-62-68-74-80-86-92
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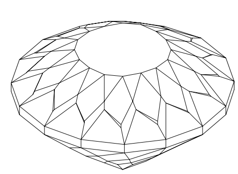
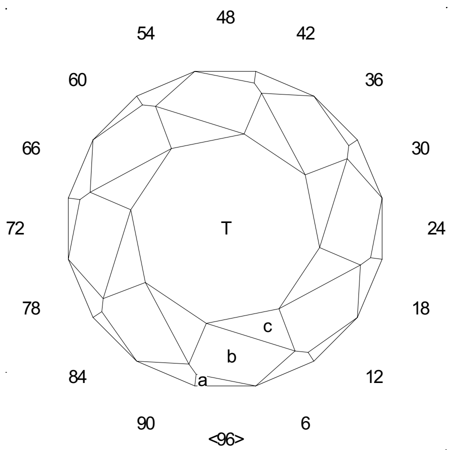
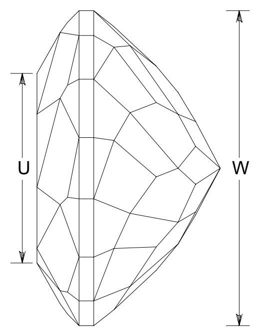
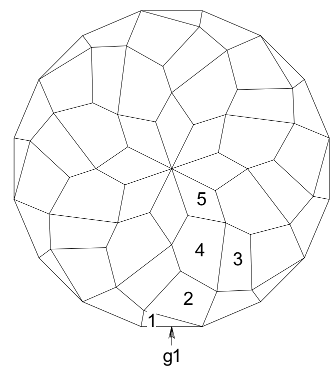
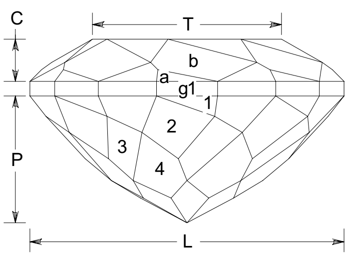
T	0.00°	Table











Layla

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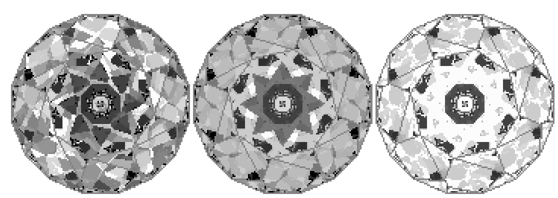
Angles for R.I. = 2.160
81 + 16 girdles = 97 facets
8-fold radial symmetry
96 index
L/W = 1.000 T/W = 0.601 U/W = 0.601
P/W = 0.404 C/W = 0.138
Vol./W³ = 0.244
Average Brightness: COS = 62.1 % ISO = 81.1 %

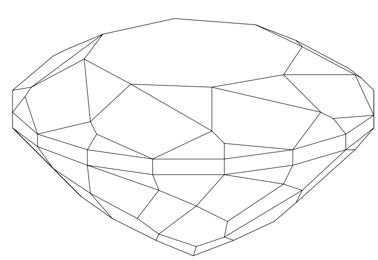


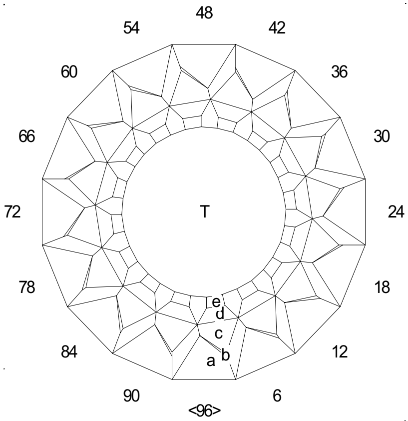
PAVILION

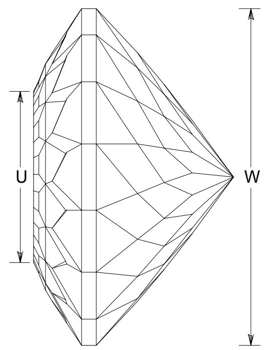
g1	90.00°	96-06-12-18-24-30-36-42-48-54-60-66-72-78-84-90
1	54.71°	96-06-12-18-24-30-36-42-48-54-60-66-72-78-84-90
2	48.31°	01-13-25-37-49-61-73-85
3	42.19°	09-21-33-45-57-69-81-93
4	38.23°	06-18-30-42-54-66-78-90
5	28.92°	11-23-35-47-59-71-83-95

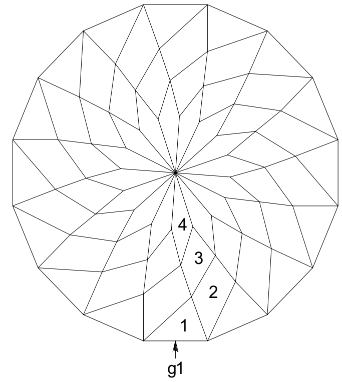
CROWN

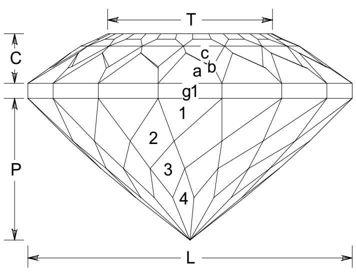
a	47.00°	96-06-12-18-24-30-36-42-48-54-60-66-72-78-84-90
b	32.30°	02-14-26-38-50-62-74-86
c	29.00°	03-15-27-39-51-63-75-87
T	0.00°	Table











Lucy

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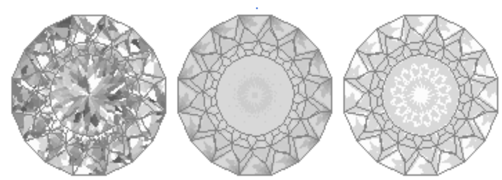
Angles for R.I. = 1.760
177 + 16 girdles = 193 facets
32-fold radial symmetry
96 index
L/W = 1.000 T/W = 0.506 U/W = 0.506
P/W = 0.424 C/W = 0.148
Vol./W³ = 0.229
Average Brightness: COS = 85.7 % ISO = 92.5 %

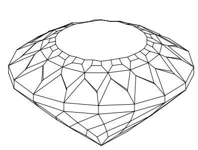


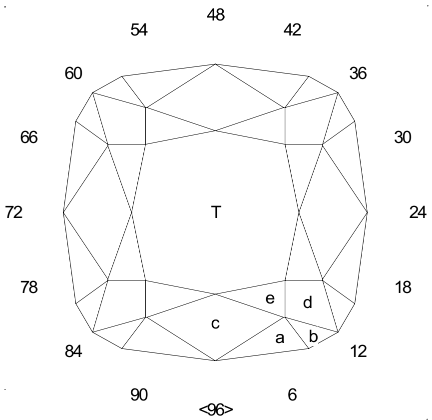
PAVILION

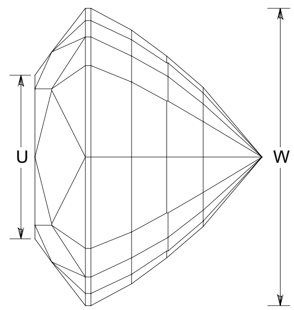
g1	90.00°	96-06-12-18-24-30-36-42-48-54-60-66-72-78-84-90
1	44.00°	96-06-12-18-24-30-36-42-48-54-60-66-72-78-84-90
2	42.00°	05-11-17-23-29-35-41-47-53-59-65-71-77-83-89-95
3	40.00°	04-10-16-22-28-34-40-46-52-58-64-70-76-82-88-94
4	38.00°	02-08-14-20-26-32-38-44-50-56-62-68-74-80-86-92

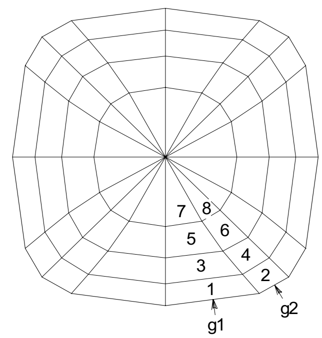
CROWN

a	35.00°	96-06-12-18-24-30-36-42-48-54-60-66-72-78-84-90
b	33.00°	01-04-07-10-13-16-19-22-25-28-31-34-37-40-43-46-49-52-55-58-61-64-67-70-73-76-79-82-85-88-91-94
c	31.00°	02-08-14-20-26-32-38-44-50-56-62-68-74-80-86-92
d	26.00°	02-08-14-20-26-32-38-44-50-56-62-68-74-80-86-92
e	23.00°	02-05-08-11-14-17-20-23-26-29-32-35-38-41-44-47-50-53-56-59-62-65-68-71-74-77-80-83-86-89-92-95
T	0.00°	Table



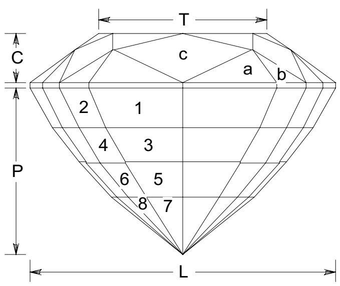




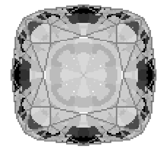
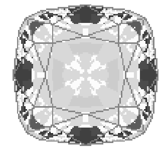


Brilliant Mixed Square Cushion II

Adapted by Ernie Hawes



Based on PC 09.069 Cullinan IV Variation #2
Angles for R.I. = 1.760
97 + 16 girdles = 113 facets
4-fold, mirror-image symmetry
96 index
L/W = 1.000 T/W = 0.554 U/W = 0.554
P/W = 0.560 C/W = 0.162
Vol./W³ = 0.310
Average Brightness: COS = 66.9 % ISO = 78.9 %

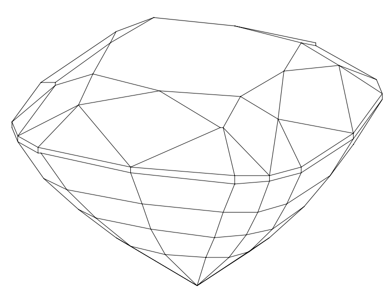




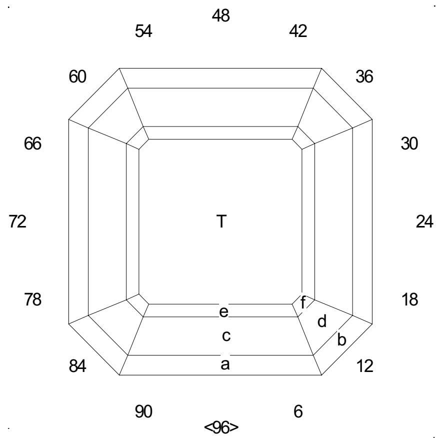
PAVILION

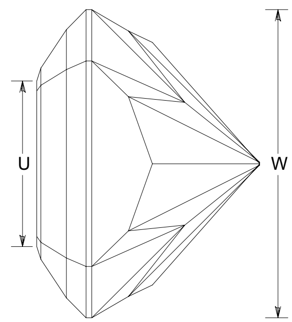
g1	90.00°	02-22-26-46-50-70-74-94
g2	90.00°	08-16-32-40-56-64-80-88
1	61.50°	02-22-26-46-50-70-74-94
2	57.40°	08-16-32-40-56-64-80-88
3	54.10°	02-22-26-46-50-70-74-94
4	49.70°	08-16-32-40-56-64-80-88
5	47.00°	02-22-26-46-50-70-74-94
6	44.10°	08-16-32-40-56-64-80-88
7	40.00°	02-22-26-46-50-70-74-94
8	37.90°	08-16-32-40-56-64-80-88

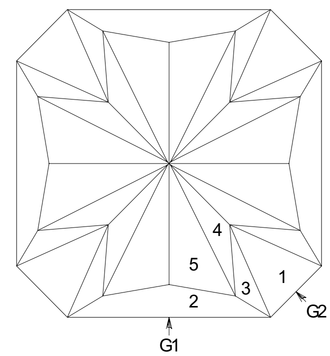
CROWN

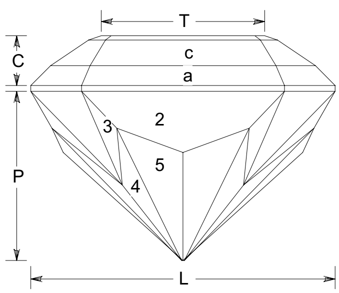
a	42.60°	02-22-26-46-50-70-74-94
b	38.80°	08-16-32-40-56-64-80-88
c	36.00°	96-24-48-72
d	33.50°	12-36-60-84
e	25.10°	03-21-27-45-51-69-75-93
T	00.00°	Table







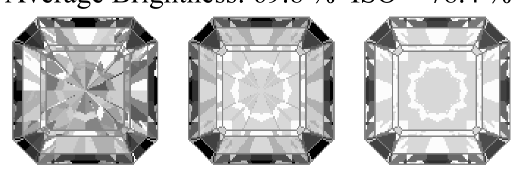




Square Cross II

By Ernie Hawes

Angles for R.I. = 1.650
57 + 8 girdles = 65 facets
4-fold, mirror-image symmetry
96 index
L/W = 1.000 T/W = 0.537 U/W = 0.537
P/W = 0.555 C/W = 0.165
Vol./W³ = 0.321
Average Brightness: 69.8 % ISO = 78.4 %



PREFORM

PF1	33.50°	96-24-48-72	Cut to temporary centerpoint
PF2	29.30°	12-36-60-84	Cut to centerpoint of PF1
G1	90.00°	96-24-48-72	Set gem diameter
G2	90.00°	12-36-60-84	Cut to level girdle line with G1

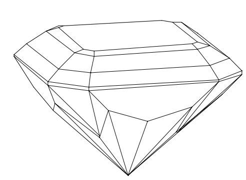
PAVILION

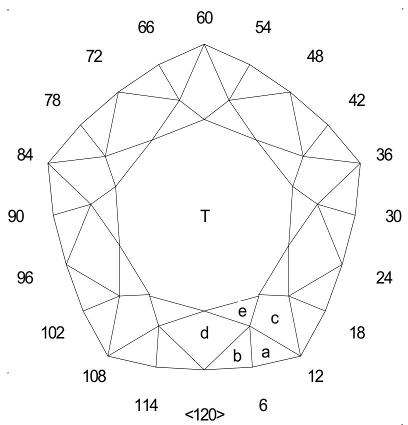
G2	90.00°	12-36-60-84	Cut to level girdle line with G1
1	45.00°	12-36-60-84	Cut to new TCP
2	61.80°	96-24-48-72	Cut to girdle line set by 1
3	44.35°	11-13-35-37-59-61-83-85	Meet at tip of 2
4	41.90°	09-15-33-39-57-63-81-87	Meet at tip of 2; set final centerpoint
5	42.70°	03-21-27-45-51-69-75-93	Cut to centerpoint created by 4

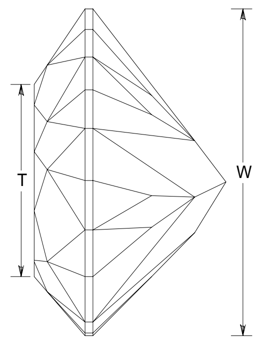
CROWN

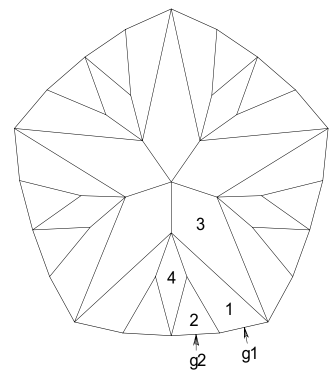
a	45.00°	96-24-48-72	Set girdle thickness
b	45.00°	12-36-60-84	Meet at girdle line set by a
c	35.20°	96-24-48-72	Steps c,d,e,f and T are not meetpoint
d	35.20°	12-36-60-84	
e	17.00°	96-24-48-72	
f	17.00°	12-36-60-84	
T	0.00°	Table	

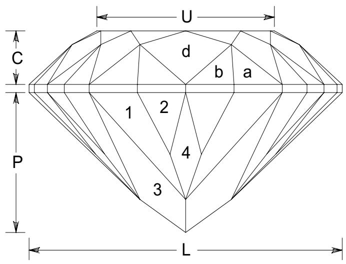
Preform requires substantial depth of rough. If cutter chooses not to use a preform, angles for 1, 2 and 3 on the pavilion will require modification and should be cut after pavilion facets 4 and 5, followed by g1 and g2. G2 will have to be estimated.







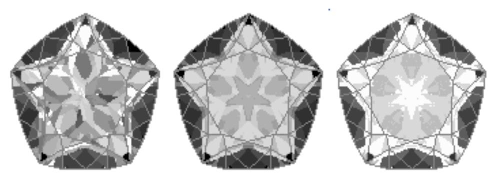




Eva's Star

copyright Danny Hargreaves

Angles for R.I. = 1.760
71 + 20 girdles = 91 facets
5-fold, mirror-image symmetry
120 index
L/W = 1.008 T/W = 0.588 U/W = 0.569
P/W = 0.429 C/W = 0.162
Vol./W³ = 0.218
Average Brightness: COS = 60.0 % ISO = 71.7 %

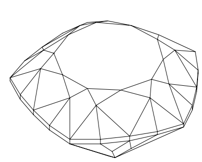


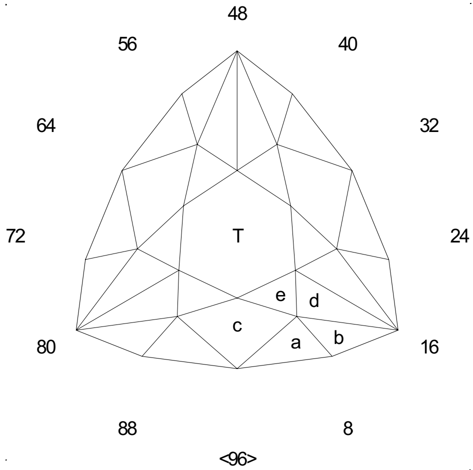
PAVILION

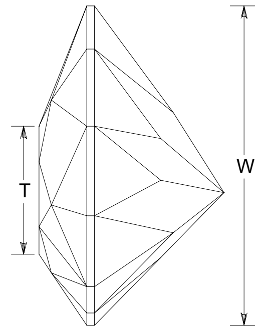
g1	90.00°	004-020-028-044-052-068-076-092-100-116
g2	90.00°	001-023-025-047-049-071-073-095-097-119
1	44.56°	004-020-028-044-052-068-076-092-100-116
2	46.56°	001-023-025-047-049-071-073-095-097-119
3	39.00°	012-036-060-084-108
4	46.11°	120-024-048-072-096

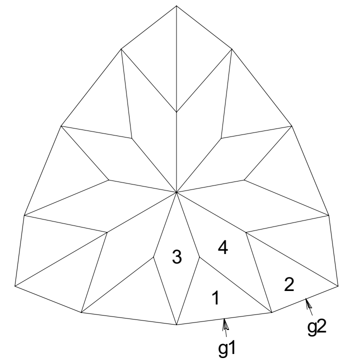
CROWN

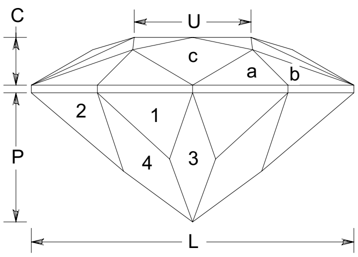
a	43.86°	004-020-028-044-052-068-076-092-100-116
b	43.57°	001-023-025-047-049-071-073-095-097-119
c	35.00°	012-036-060-084-108
d	41.82°	120-024-048-072-096
e	26.68°	005-019-029-043-053-067-077-091-101-115
T	00.00°	Table







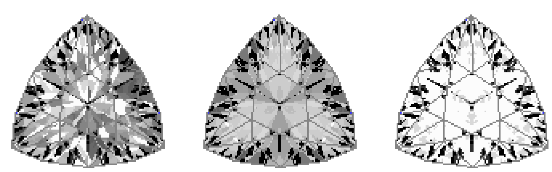




Easy Cushion Triangle

By Ernie Hawes

Angles for R.I. = 1.540
49 + 12 girdles = 61 facets
3-fold, mirror-image symmetry
96 index
L/W = 1.011 T/W = 0.404 U/W = 0.363
P/W = 0.405 C/W = 0.151
Vol./W^3 = 0.171
Average Brightness: COS = 60.0 ISO = 78.7

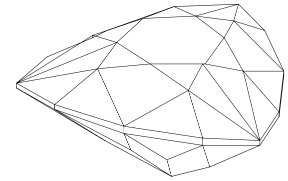


PAVILION

g1	90.00°	02-30-34-62-66-94	Establish width
1	45.80°	02-30-34-62-66-94	Cut to center point
2	42.50°	06-26-38-58-70-90	Meet center point
g2	90.00°	06-26-38-58-70-90	Cut to even girdle line
3	44.20°	96-32-64	Cut to center point
4	42.50°	04-28-36-60-68-92	Cut to center point

CROWN

a	38.90°	02-30-34-62-66-94	Set girdle thickness
b	35.20°	06-26-38-58-70-90	Cut to level girdle
c	34.20°	96-32-64	Meet at girdle
d	22.10°	14-18-46-50-78-82	Meet at girdle
e	16.00°	07-25-39-57-71-89	Meet at juncture of a,b,c,d
T	0.00°	Table	Cut to juncture of c and e



NOVICE CORNER

By Ernie Hawes

Those of us who have been faceting for a long time tend to take for granted many of the things the novice faceter is having problems with, or doesn't understand, or doesn't even know about. This new column will try to cover a lot of basics and some things more advanced faceters really need to know. If possible, we'll also try to put some information on our website on a fairly regular basis, and will offer the opportunity to ask questions that we can address online. And when I say we, I expect others to contribute to this column and to the website, because together we have a lot more to share than just what I or any of the other long time members knows individually. Also, whatever is put online will be summarized annually in this column.

First off, I want everyone to understand that although I've been faceting for over 35 years, I don't know everything and don't have all the answers. I'm not kidding when I say that I'm still learning. I read something about faceting or try something new almost every day. That's one of the perks of being retired. There truly is an enormous amount of knowledge to be gained about faceting, and more becomes available all the time, especially in several online forums. One caveat that I ask you to always remember: what works for me may not work for you. There usually are different ways or variations of ways to do almost anything. So it's always wise to try different methods or techniques to find the one that works best for you. With that said, let's get down to business.

Frequently, I hear or read about faceters having problems with scratches, primarily while polishing or pre-polishing. All faceters encounter scratches, but some a lot more than others. Why is that? Well, there are several answers to that question, and I'll try to cover some of them over time. Right now, I want to talk about what I think is one of the more common culprits that causes some faceters to encounter scratching more frequently than others, and that is cleanliness, or the lack thereof.

In workshop after workshop, I've seen faceters come in with a filthy splash pan, or with dried faceting residue scattered over their machine. I confess, I'm as guilty of this as anyone. It's so easy to be sitting at the machine cutting away when something interrupts, a phone call, dinner, someone at the door, etc. Before you realize it, you've stopped your faceting for the day, and other things keep you so busy that you forget to go back and clean up. Perhaps you decide that it won't really hurt to leave the machine set for a day or so, and eventually, the machine stays dirty for a lengthy period. In my house, dust is also a problem. My faceting machine is located in our sun room near the doggy door. We have three dogs that go in and out the doggy door numerous times each day. The tile floor gets dirty quickly, and no matter how often I clean it, dust is stirred up and settles on everything.

Dust, whether from faceting residue, from the floor or elsewhere, is a frequent cause of scratches on your stone. It's not the only cause, but it is a major one. Think about it, faceting residues are miniscule bits of the very hard material you've been cutting. Air-borne dust includes miniscule bits of native rock, also hard. And when it gets in between the stone and the lap, scratches are frequently the result, especially when you're polishing and not using a regular water drip.

Exactly how you clean your machine is up to you, but I encourage you to do it regularly, at the end of each faceting session if possible, and any time you finish a stone of one hardness and start on a new one of lesser hardness. You're in luck if your splash pan comes off easily so it can be washed out. I recommend doing this outside so you're not washing potentially harmful residue down the drain where it can flow downstream to somebody else's water supply. On splash pans that are not easily removed, I suggest using damp paper towels to wipe the splash pan residue out. The rest of the machine should be wiped down with damp paper towels to remove any dust, stone or polish residue.

Finally, it makes a lot of sense to cover your machine and its accessories when not in use. Some machines have covers available from the manufacturer, others do not. Personally, I find the bags clothes are covered with when they come from the dry cleaners to be quite large and work very well to cover the machine. And they can be replaced very easily.

Questions or comments may be sent to faceter@q.com.

GRAVES INTRODUCES NEW MARK V

The Graves Company, one of the oldest faceting machine manufacturers in the US, recently introduced a new faceting machine. It's called the Mark 5XL and is based on the stainless steel XS III faceting head custom manufactured by Jonathan Rolfe. The Mark 5XL incorporates all the essential elements of the XS III, but uses less expensive materials in its manufacture. None the less, it is a serious step up from Graves' simpler Mark I and Mark IV. Both of those machines used the same faceting head, but on different bases. The base on the Mark 5XL is identical to the one used on the Mark IV. In selling the manufacturing rights to the XS III design to Graves, Jonathan Rolfe will no longer be manufacturing the XS III and will focus his efforts on his famous BATT line of laps.

The Mark 5XL was first announced last year, but few if any machines were delivered then. Demonstrated in the Graves tent at Electric Park during the 2008 Tucson show, the Mark V drew considerable interest, and had many folks saying they wanted to order one. At first, delivery was scheduled for five weeks, but getting the manufacturing process up to speed has taken more time than expected. Priced now at $1695.00, the Mark 5XL is on the low end price wise of the faceting machine market. Consequently, it promises to be a serious contender for a good chunk of the faceting machine business, particularly among beginning faceters. However, more advanced faceters will probably be looking at it as well.

Short Course in Silversmithing

offered by Elaine Weisman, MFA
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If you have ever wanted to try classic silverworking before going to the expense of investing in new materials and supplies, try this short course of one-on-one instruction, and find out, if smithing is for you.

Five two-hour sessions: Hands-on experience in construction techniques: Sawing, filing, forming, soldering, finishing and stone setting.

Complete a Pin, a pair of Earrings and a Ring or Pendant.

A Cup of Coffee

A group of alumni, all highly established in their respective careers, got together for a visit with their old university professor. The conversation soon turned to complaints about the endless stress of work and life in general…!

Offering his guests coffee, the professor went into the kitchen and soon returned with a larhe pot of coffee and an eclectic assortment of cups: porcelain, plastic, glass, crystal - some plain, some expensive, some quite exquisite. Quietly he told them to help themselves to some fresh coffee.

When each of his former students had a cup of coffee in hand, the old professor quietly cleared his throat and began to patiently address the small gathering…"You may have noticed that all of the nicer looking cups were taken up first, leaving behind the plainer and cheaper ones. While it is only natural for you to want the best for yourselves, that is actually the source of much of your stress-related problems!"

He continued…"Be assured that that cup itself adds no quality to the coffee. In fact, the cup merely disguises or dresses up what we drink. What each of you really wanted was coffee, not a cup, but you instinctively went for the best cups…Then you began eyeing each other's cups…"

"Now consider this: Life is coffee. Jobs, money, and position in society are merely cups. They are just tools to shape and contain Life, and the type of cup we have does not truly define nor change the quality of the Life we live. Often, by concentrating only on the cup, we fail to enjoy the coffee that God has provided us. God brews the coffee, but he does not supply the cups. Enjoy your coffee."

The happiest people don't have the best of everything - they just make the best of everything they have… So please remember: Live simply. Love generously. Care deeply. Speak kindly. And remember - the richest person is not the one who has the most, but the one who needs the least.

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We wish you much happiness and prosperity in the coming year.

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A few more beautiful pendants by Steve and Nancy Attaway

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