Glen R. Hahn: One of North America's First Amateur Faceters

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North York Faceting Guild(Toronto),
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In a previous article published in the United States Faceting Guild's**, "THE EARLY FACETING COMMUNITY IN NORTH AMERICA," (**Volume 8, No. 4, December, 1998 and Volume 9, No. 1, March, 1999), an overview was given of the emergence of our early amateur faceting community on our continent during the late 1920's and early 1930's. It was based on solid research. Information contained in it subsequently formed the essence of the first chapter in Peter Collins and John Broadfoot's 2003 book, '**Cutting Gemstones : a Beginners Guide to Faceting'**.

That article encouraged members of our amateur faceting community to seek out and preserve the documents and photos from these early times before they disappeared. Sadly, the end of the article indicates the possible tragic news of the current state of an extraordinary source which would have revealed the identity and solitary efforts of the early amateur faceting pioneers in North America before the 1930's.

Due to the foresight of perceptive individuals who understood the importance of the preservation of such documentations and photos (one a former British spy, gem dealer and founder of a gemological association and the other a famous geologist), the documents and photos of one of these early pioneers survive. These are the letters of Glen R. Hahn to Grant Waite, author of many **Lapidary Journal** articles, 1940-60's.

The Period of Hahn's Faceting Involvement

Glen R. Hahn started to facet when one cut in isolation.

This photo allows us to identify the approximate time period of his involvement in faceting.

Do you know your cars? Take a guess.

Before reading on, Google it, if you dare and have patience.

Go ahead, have fun.

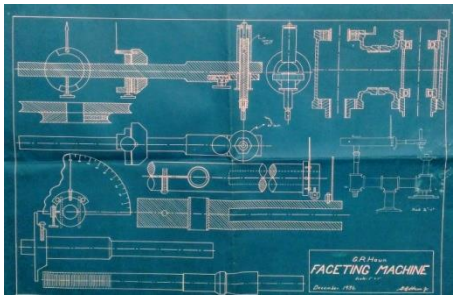
His wife's hair style is very typical of the time period. Do you recognize it?

The car appears to be a 1936 Hudson Terraplane.

On the left, we can confirm when he was cutting.

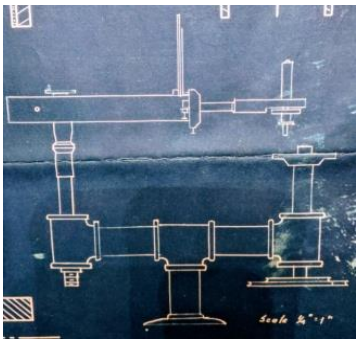
← It is obvious that he designed and built his own machine.

The blueprint below was his ***third*** machine, though…, quite impressive. If it was his third machine, can we deduce when he started to facet?



Certainly before the mid-1930's.

The parts of his third machine are on the left, and a view of his machine on the right.



What is fascinating is that he started to facet at the same time as a small number of individuals at an amateur level first began to do so in North America.

An amateur interest in the earth sciences started during the mid- to late 1920s on our continent. Groups were formed to host presentations and provide camaraderie in these scientific discussions.

Just before the middle of the 1930s, during the worst of the Depression, evidence exists that individuals started to facet, almost always completely on their own.

Glen Hahn was no exception.

His initial amateur interests were in geology, mineralogy and paleontology. Then he started to wonder about gems.

What should impress us is that he had absolutely no help whatsoever. He had neither photographs nor diagrams of a faceting machine to use as a guide, let alone a text or mentor to explain the faceting process to him.

He wrote that he had to work it out completely by himself.

Imagine staring at a cut gem and trying to figure out yourself how the facets were placed on a transparent mineral with no previous knowledge. Could we, on our own, have considered the value and utilization of angles and bearings? Similarly, would we have determined the process of grinding and transferring?

All this was before the design and construction of a functioning machine. If we didn't understand the process of faceting, how can we design a faceting machine? Imagine the creativeness and implementation of his thoughts so early in our hobby. Obviously, only a few of us could have managed to emulate him.

It is understandable why most people who wanted to make something associated with their interests in the earth sciences began creating cabochons or polishing rock slices by the end of the 1920s and early 1930s. If any of these individuals thought about faceting gems, only a fraction of them could have achieved their goal at that time.

Since faceted gems were available for purchase by the North American public, it would be reasonable to ponder why knowledge of the faceting process was not available to the public. A few commercial cutters and small firms existed in various cities on our continent at the time, but the vast majority of the gems for sale in North America were cut in Europe. Wherever these commercial cutters were located, absolutely none of them wanted to share their methods because they didn't want competition.

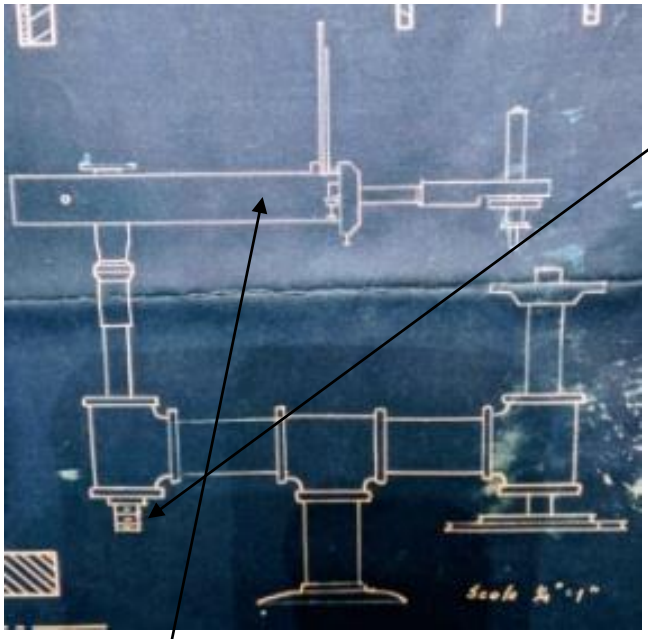
Amateurs were on their own, a situation which may explain why members of our North American amateur faceting community were so keen to share their knowledge. Such a community spirit continues to this day. Until an individual somehow linked up to the amateur community, learning how to facet was a lonely, difficult process. For Glen R. Hahn, tentative links to a nascent amateur faceting community only began in 1937.

His Third Faceting Machine

An examination of his 1936 machine is a testament to his accomplishments up to that time and to those of his fellow pioneers elsewhere.

The above is part of his machine. Note the threads on the left; on the right the end is narrower than the preceding part.

Now, where is this part located on Glen R. Hahn's machine below? See where it belongs on the blueprint below.

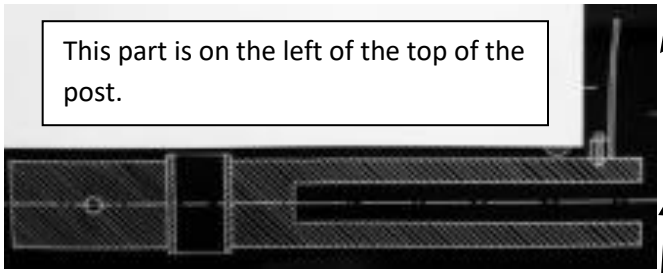


It was the post.

Note where its threads are located.

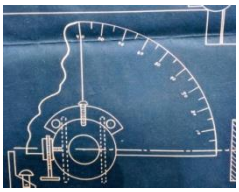
Glen R. Hahn made this machine from pipe fittings and parts he cast himself.

Obviously, Glen Hahn must have been an able metalworker.



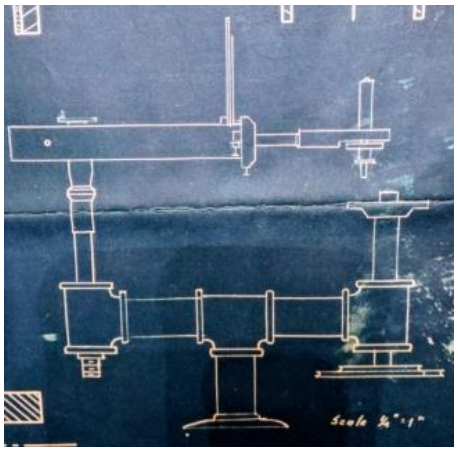
This part is on the left of the top of the post.

But what is the pin on top of this part to the right?



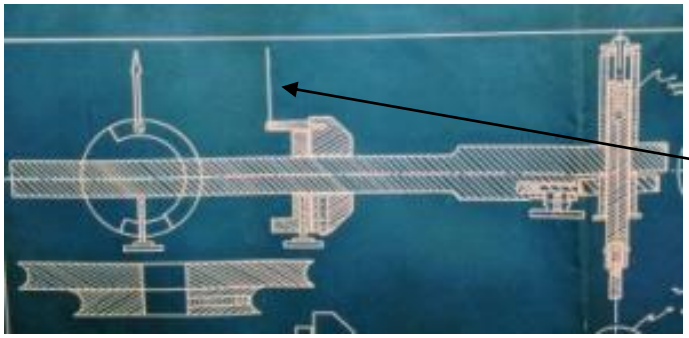
As you can see, it is the protractor.

The units are five degrees each.

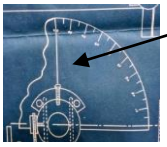


What goes into the above cavity?

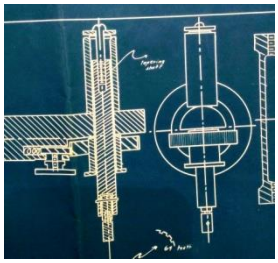
Examining the machine design, one can determine the answer.



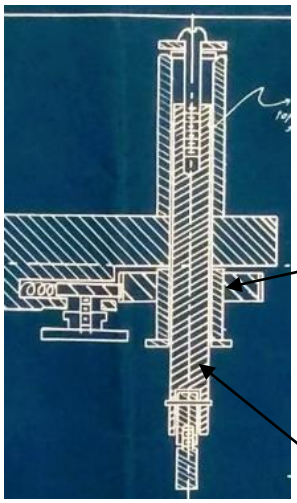
The left-hand end of this cylindrical part goes into the cavity. However, what could the pin-like part in the middle be?



It's the pointer for the protractor to set the facet angle.



The above diagram and the one to the left are the two sides of the quill which holds the dop.



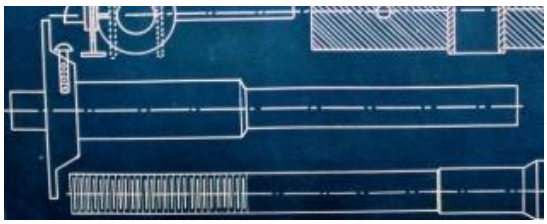
The reason why this article devotes so much space to the various parts of his third machine is to allow us to better appreciate the extraordinary capability of Glen Hahn and his few fellow pioneers.

It is worth repeating, he had to work it out completely on his own.

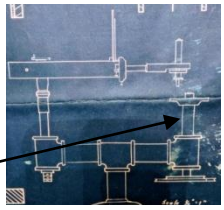
He wrote that it took him four to six months to figure out how to create and integrate his 64-tooth index wheel with the machine.

Obviously, he was a highly skilled, creative individual.

It must have been difficult to have tapered this shaft so described on the blueprint. One can imagine the reason he decided to do so. Unfortunately, his blueprint does not indicate how he affixed the dop to the shaft.



To complete our examination of his machine, this is the shaft on which the laps were placed.



The Merits and Disadvantages of the Third Machine

Glen Hahn was quite proud of his third machine.

His previous machines had the basic features to enable control of the angle and position of each facet on the stone and were able to intersect other facets as he wished.

Each subsequent machine was an improvement over its predecessor. This third was more accurate than the previous one which was similar in design. In 1937, he wrote, “My biggest source of trouble has always been the ability to raise or lower the stone accurately without changing the angle of the facet.” When he changed laps, he found that his previous machine altered the plane of the facet face on the lap. The polishing lap only touched part of the facet.

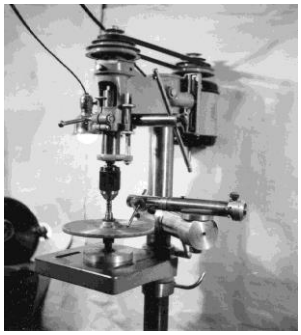
He continued in the same letter, “…I eliminated every source of play possible, even to casting all parts extra-heavy so that the metal, which is now brass, would not spring sufficiently to change the angle very much. It is necessary, or at least very desirable to be able to raise or lower the lap 1/1000ths of an inch. With my new machine I can now do that to 1/1400ths of an inch.” He wrote that he could now put sixty-four facets on the head of a pin. Later, he donated a copy of the design to the University of Alberta and sent it to some people around the United States.

As well, he could swivel the arm up in order to assess the quality of polish or facet meets. He could also see the notches on the index wheel relatively easily.

There were problems with this machine, though. To raise and lower the stone, he had to turn the threaded post on top of which was a heavy arm. His protractor gave him only general control over the angles since it had units of five degrees. Finally, there was no cheater on the unit.

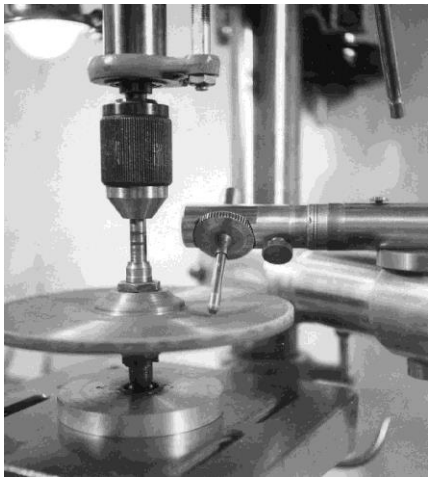
His Fourth Machine

Despite the fact that his faceting machine worked, he wasn’t satisfied.



By November, 1937, he had made his fourth machine with a very different design.

It obviously utilized a drill press.



This time, there was a vernier scale engraved on the cylindrical arm. It is not known if its units of degrees were smaller in number than five degrees.

His correspondence seemed to suggest that the lap itself was moved to or away from the stone, not vice-versa. This was quite novel.

The Absence of a Splash Guard

Did you notice that there was no splash guard on his machines? Yet, it is used to catch the lubricants, ground material (swarf) and water flung from a spinning lap. Surely he would have encountered splash problems if he used a liquid.

Yet, he wrote that he didn't need a splash guard. This is because he ran his lap at a low speed, only 250 rpm. "Everything remained on the lap," he wrote.

When it came to polishing, he did use water but applied it in a very different way which did not require the use of a splash guard.

In one of his letters, he mentioned that he found wet polishing led to scratches which didn't occur on a dry lap. He advised that one should start with a wet polishing compound on the lap, no thicker than a layer of skim milk, then spin the lap at low speed until perfectly dry. "The lap is ready when it is snow white…."

It all worked to his satisfaction.

Laps and Substances for Grinding and Polishing

He had to experiment with whatever he could find. Eventually, he discovered what worked for him.

First, he shaped the stone on a wheel.

He found the laps for grinding easily enough since industry offered many alternatives. He used a cast iron lap with 600 grit Carbo (Carborundum) moving straight to a polishing lap.

However, he encountered more difficulty in finding a lap which gave a magnificent polish. Only after trying about fifteen different types of laps used in the industrial, non-faceting world, did he discover an effective lap. He raved about what he himself called composition laps. The reader has undoubtedly heard of composition laps using such metals as zinc, tin, Babbitt-metal and lead.

His favorite composition laps were quite different but familiar to most of us. These laps had tiny grooves on them. We can surmise the value of the grooves, namely to hold polishing powder on the lap. In fact, his composition laps had spiral grooves on them. "What value would a series of spiral grooves have in polishing?", one might ask. Yet, he found this type of lap highly successful.

Have you figured out what his composition laps were? A hint, they are called composition laps for a reason other than its components.

He used vinyl phonograph records, of course…, used ones. He advised a fellow faceter to throw out those made by the Edison Company. They were useless, as they always left scratch marks on the gem being polished. The Columbia and Victor labels were perfect

When he later became involved with the amateur faceting community, Hahn wrote a short paper on the composition lap in Dr. H. C. Dake's ***The Oregon Mineralogist*.** At the mid-1930s, there were two competing small periodicals which served the interest in earth sciences to a minor degree. Note the title of this one. The other one was also not focused on crafts. However, both had a lapidary section including but far less directed to faceting.

Hahn discovered that he could polish a Standard Round Brilliant 1 carat stone using just one composition lap. Each side would be good for either the crown or pavilion. After both sides were used, the record would have to be thrown out.

He didn't use his composition laps when he started to cut his first sapphire figuring the gem species would be too hard for them. However, months after trying to polish his first and only sapphire during 1938, still dissatisfied with its polish, he reverted to the composition laps. Elated with his success, Hahn remarked on his surprise that the much softer composition laps worked so well on sapphires.

He experimented with sixteen polishing agents on his composition laps and others concluding that Norton alumina powder, E1-111-H worked best. In a July 16, 1937 letter, he wrote that it, "…was the last word if you can get hold of it. It will exceed your fondest expectations and useless to try anything else." Nevertheless, he later wrote that he looked forward to using a new Norton product called Norbide, expecting even better results with it.

He never cut a stone which did not have at least 2-3 facets on one side which gave him trouble. Hahn advised patience and technique to overcome these more difficult directions. Simply wash the lap with a brush, then re-apply E-1-111-H. By the way, he also discovered that wet E1-111-H would leave scratches.

Adhesive, Transfer Jig, Table Device

Unfortunately, there are no references in his correspondence to what adhesive he used to adhere the stone to the dop. He obviously had constructed a transfer jig and used a device to cut the table facet; similarly, we don't know their designs.

Gem Designs

He only used one design, the Standard Round Brilliant. We don't know where he came across it.

We have to think outside our own times with our many wonderful looking gem designs, their diagrams, the availability of Gemcad, organized angles, bearings as well as tier numbers on the facet images. It is clear that such helpful designs were not available during Hahn's early days.

One might suggest that our faceting pioneers found some basic designs somewhere or other. However, we have to consider that Hahn and his fellow pioneers who cut in isolation from each other could very well have examined popular gems being sold at the time. They might have had to determine the number of facets per tier, then calculated their bearing. As well, they may have had to guess the approximate angles on each tier to cut their stones.

Not all of our faceting pioneers would have realized that they could improve the optical performance of their cut stones by changing the angles of the mains in particular. This likely would have involved cutting a good number of stones with different angles to evolve the best combination of angles or more likely a relatively pleasing combination. Hahn may have been one of the latter experimenters. He was aware that cutting a too low pavilion main angle resulted in the light escaping the pavilion, what we call the "fish eye" effect. He had no name for this characteristic. His perception was all the more remarkable given the fact that he worked alone. However, it appears that he was unaware that the angles should change according to the different refractive index of the gem rough.

A lot of time, thought, cutting and patience were required to develop a good design. No wonder Hahn had only one index wheel and a single design.

Faceting Rough

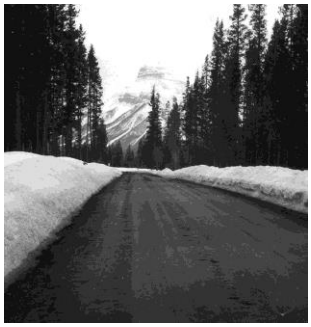
Hahn had problems acquiring rough. In 1930s Calgary, Alberta, where would one go to find sources? He collected mineralogical specimens, so gem crystals could be found.

His fundamental source up until 1937 was what he could discover near Calgary.

He was more than willing to travel in order to find gemstone rough. In those days such sites were pristine.

One of his collection locations was Banff National Park, Alberta, Canada. Conservation was not a major concern at the time.

These photos are of his route in the park to the Crowsnest Glacier site where he acquired most of his faceting rough. Today, there is a major paved highway along which some of us may have travelled.



This is a view of the Crowsnest Glacier in the late 1930s. You will see less of the glacier today.

This photograph was taken across the valley from the glacier. The location is where the rock crystal beds were from which Hahn acquired his transparent quartz for cutting.

Hahn mainly cut quartz. From another, more distant place in the Rockies, he also acquired zircon. It was the latter which offered the greatest problems in polishing until he discovered composition laps. In addition, he cut amethyst from Thunder Bay, Ontario.

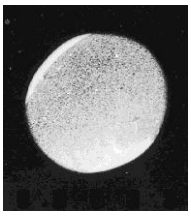
In 1938, he cut his first and only piece of corundum, a blue sapphire, rough given to him by Grant Waite from Toronto.

The Great Depression took place during this period. While its worst year was 1933, the economy slowly improved until 1938 when it became almost as bad. Glen Hahn, in charge of the Texas Company in Calgary, felt he could not pay more than $5-$10 for his rough at any one time.

He did not aggressively pursue sources of rough as did others such as Grant Waite. Sources for rough did exist, but one had to doggedly seek them out because their existence and contact information were not widely available. It is known that he bought mineral specimens from Wards in Rochester, but no mention was ever made of the company as a source for cutting material.

His Other Interests

Glen Hahn was not totally focused on faceting like some of us. He had a wide range of interests ranging from mineralogy, paleontology, geology, gemology to other earth sciences.



For example, he was involved in polishing thin slices of trees, dinosaur fossils from the Badlands of Alberta, and animal bones, including those from humans, a polished slice of which is seen in this image.

He also enjoyed making different machines which he implied in a letter attracted him more than did faceting.

The degree to which he was devoted to faceting is indicated by his decision about a fine apatite mineral specimen in his display cabinet. It was a beautiful mineralogical specimen. Because he had never faceted apatite gem rough, he seriously considered using it to cut a gem. He concluded that it was too beautiful a mineralogical specimen to cut. Thus, it remained in his cabinet. Would we have done the same?

Readers may be interested to learn that Hahn didn't enjoy cabbing. He wrote that he just couldn't get the hang of it.

Glen R. Hahn

He obviously had machinist and corporate managerial skills.

He was intellectually focused, with links to the University of Calgary in particular, its mineralogical and geological departments. All of his four machine designs were deposited at the university. He also maintained friendships with others in Calgary who were involved in the non-university mineralogical, geological and corporate activities.

He was married and had two sons, one of whom was eighteen at the beginning of World War Two in 1939 for Canadians and thus of military age. Naturally, he was concerned about his son's future.

Grant Waite received a letter from Dr. George Johnson in June, 1941. Glen R. Hahn was having a breakfast of eggs and bacon when he suddenly died of a massive heart attack. He was forty-seven years old.

Johnson wrote that Hahn had many friends who found him to be a wonderful person with a very pleasant personality. He was sorely missed. He also wrote that Hahn found much satisfaction with his polishing technique; and that his faceting machine was a source of great delight. Apparently, since January, 1941 he had fixed up his workshop as he wanted it. Ever since then, the workshop had between one and three people visiting each night, all engaged in their shared interests.

To say the least, Glen R Hahn definitely deserved accolades.

Future Research

Hahn was almost forgotten.

How many other members of our early pioneers have been forgotten only because the documents and evidence of their existence have disappeared?

To investigate further, what would we have to do?

One would have to research the surviving documents of the early earth science groups, if any survived. Also, periodicals would have to be examined, such as ***Rocks and Minerals*** which started in 1926 and first gave space to general lapidary interests in 1929. However, its circulation was very small. Only 1548 copies were printed in 1930 increasing to 5226 eight years later. Its competitor started in 1933, ***The Oregon Mineralogist*** had a similar circulation. The Gemological Institute of America in Los Angeles has copies of almost all the issues of these periodicals.

One could examine the personal papers of J. Harry Howard of South Carolina responsible for the lapidary section in ***Rocks and Minerals*.** The section started after the periodical printed an appeal from Howard for cutters to contact him. He corresponded with cutters in 1929 and afterwards. If an early faceter had subscribed to this periodical, he may have written to Howard. The only problem was in the use of the word 'cutter'. Too often, it referred to cabochons or thin slices of rock rather than faceting. It was hard to work out during research when this term was also being used for faceting.

Unfortunately, the McKissik Museum of the University of South Carolina to which Howard's world class gems and personal papers were given in 1962 may not have cared for his documents very well. In fact, due to structural deterioration and budgets, boxes of Howard's papers were given for safe keeping to the *Columbia Gem and Mineral Society* affiliated with the museum. This society was contacted during the late 1990s. They had the boxes but no inventory of their contents had been made. I reached out to them again in 2018; sadly no one remembered the boxes.

No matter who else is discovered to have been one of the first amateur facetors, one should keep in mind that other faceters could have struggled in solitary but who are now completely forgotten.

Hopefully, this article will encourage you to seek out these early pioneers in your personal locale and preserve their admirable struggles to learn how to facet?

If you wish to read the complete article, "The History of the Amateur Faceting Society During the 1930's"in its entirety of the 1998 & 1999 article on the early history of our amateur faceting community, visit the website of the North York Faceting Guild.