importance of some strengths or features versus others will vary from individual to individual. These preferences will also almost certainly evolve as you gain experience and skill.

The best approach is a "try before you buy" strategy. This basically means finding a club or get-together where you can take a number of different machines for a spin. Unfortunately, as mentioned above, hobbyist faceters are pretty well dispersed throughout the world, and the nearest club may be a substantial distance away. Another alternative is to take a faceting course. This is an excellent idea for the beginning faceter anyway. Check with the teacher or school on the availability of different types of faceting machines. Planning an extended trip to take advantage of a club or faceting course is also an excellent means of focusing your energies and thoughts on exactly what you want.

The larger gem shows will attract dealers in all types of hardware, including faceting machines (Figure 2-16). Although you won't be allowed to actually sit down and cut a stone, these get-togethers provide a unique opportunity for side-by-side comparison of features, build quality, and price.

The web-based discussion groups (Chapter 15.1.3) are also a useful source of information on faceting machines, but be warned: this is yet another area in which opinions are strong.

Figure 2-16 Large gem and mineral shows provide an excellent opportunity for comparing machines from different manufacturers (see Chapter 6.2.2).

Given the potential financial investment, and even more importantly, the potential disappointment with a less than ideal machine, you should take your time, do plenty of reading, and if at all possible, try several different types before you commit to a purchase.

Inevitably, you will find annoying quirks and shortcomings with any hardware. Note: others may view these as "features." If you find that you have simply made the wrong choice, all is not lost. Faceting machines, as with other precision devices, tend to lose resale value very slowly when properly maintained. If you end up with a machine that you simply do not want, selling it onward is a very real and reasonable option.

2.6.1 Things to Look For in a Faceting Machine

This chapter began by emphasizing that gemstone faceting means control over two angles and one distance – effectively the cutting angle, index wheel setting, and the height. It should come as no surprise, then, that the most important thing to look for in a faceting machine is the ability to control these quantities and to control them well.

This basically boils down to precision, accuracy and ease of use. Incidentally, precision and accuracy are not the same thing. Precision refers to how repeatable an operation is, while accuracy measures how close to the desired target it comes. Turn to page 392 of Volume

2 for more on accuracy versus precision and a neat drawing of an archery target to demonstrate the difference.

Cutting a gemstone requires **precision** – that is, repeatability – because the standard workflow involves at least three distinct visits to each facet, one for rough cutting, one for fine cutting, and one for polishing. A machine lacking precision will require adjustment at each of these visits for each of the dozens of facets on a gem – hardly a prescription for enjoyment of a hobby.

Faceting also requires **accuracy**. Many modern gemstone designs use the intersections of existing facets for the placement of subsequent cuts – the so-called "meet point" technique (see Chapter 8.7). Inaccuracy in cutting leads to incorrect meet points, which in turn leads to incorrect facet placement, which in turn leads to another generation of incorrect meets, and so on. The words "and so on" at the end of the previous sentence are really just a polite way of saying disaster and frustration. Incidentally, traditional non meet point cuts often require the same or even greater accuracy.

The final piece of the puzzle is **ease of use**. Don't forget that faceting is a hobby, and your enjoyment will be directly influenced by how pleasant or unpleasant it is to interact with your machine. Do the math. Amateur cutters typically produce tens or even hundreds of gemstones per year. At perhaps five hours per stone, you will probably spend more time with your faceting machine than with any other device in your life, with the possible exception of the TV remote control, if you could only find it. An easy to use machine is truly a joy and makes faceting a relaxing, occasionally transcendent experience. An uncomfortable, balky, machine, on the other hand, can make faceting a chore, even worse than having to walk over to the television to switch channels…

So.

How can you evaluate the precision, accuracy, and ease of use of a faceting machine?

The best way is clearly to cut a few gemstones with it, but this may not be a viable option, particularly if you don't have access to a large lapidary club or a group of very accommodating faceting friends. There are a number of less direct ways to evaluate a particular machine, however. The following paragraphs list some critical questions you can ask yourself in assessing a candidate faceting machine for precision, accuracy, and ease of use.

How good is the **construction quality** of the machine? The old adage warns you not to judge a book by its cover, but for mechanical devices, external professionalism is often an indicator of internal quality. The "fit and finish" of a faceting machine will reflect how well it was put together by the manufacturer, and if you are considering a used machine, how well it was maintained by the previous owner.

Is the machine **mechanically "tight"**? With everything locked down, there should be no play in critical components such as the quill angle, rotation, and height. The lap, platen and arbor should also be free of play when stopped and free of rumble when at maximum speed. A corollary to this question is whether all critical mechanical components are properly sealed. The most precise bearings in the world will be of no help if they are subjected to a constant barrage of water and abrasives. Look carefully at all joints and flexures – if you can see the bearings, your cutting swarf can probably find them.

Are the components **solid without being overly heavy**? Spindly parts will flex under hand pressure, reducing both accuracy and precision. On the other hand, massive components may reflect a shortcut in engineering and will add weight without improving either accuracy or precision. Cast versus machined parts may point to such shortcuts, although there are very prominent exceptions.

Are the **critical angle settings** – facet angle and index wheel – clear, easy to use, repeatable and tight? Nothing can ruin your day faster and more effectively than a missed angle or index. Large, legible, and unambiguous indicators are a must. Examine the cutting angle display, for example. Can you readily interpret the exact angle? If it is a mechanical device, is the scale cramped or hard to read? How easy would it be to make an error of 1 degree? How about 5 degrees or even 10 degrees? Digital displays are not perfect either. Try dialing in a particular cutting angle. Raise and lower the quill a few times. Go away for a coffee and come back. Is the angle reading the same? Try setting a particular index a few times while seated in front of the machine. Was it easy? Did you make a mistake?

How repeatable and easy is the **height setting**? Some machines offer a calibrated absolute height scale while others have limited visual feedback. You don't need an absolute reference, but the height control must be precise and allow fine adjustment (see also page 24). If circumstances permit, try lowering a piece of scrap stone until it just touches a rotating lap. Raise the cutting head and try again. You should be able to return to the correct position using the visual indicators alone. Does the mast height adjustment allow rapid changes, or will you have to crank and crank going from the main facets to the girdle?

Almost the exact same questions apply to **the cheater** or index splitter. Actually, you should begin by asking a more fundamental question: does the machine even have a cheater? Some older faceting machines do not, reflecting the perverse and happily outmoded attitude that any mistakes are clearly operator error. Presuming an index splitter exists, can you reliably return to a particular cheater setting time after time? A real world test using a piece of scrap can help here as well. Cut a flat into the stone and mark it with indelible ink. Adjust the cheater back and forth, then return it to its original setting and do another light cut (Figure 2-17). Was the ink mark removed uniformly?

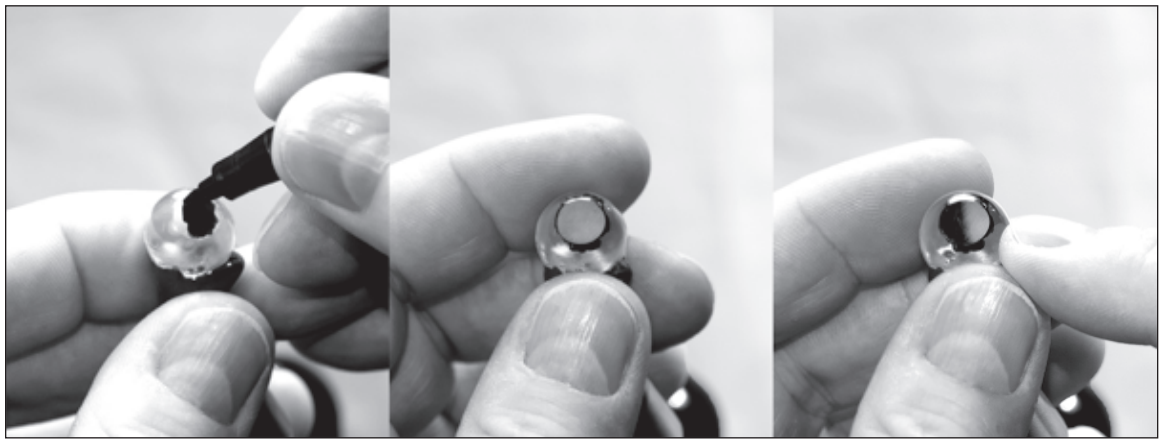

Figure 2-17 An inked flat cut into a piece of scrap, for example a marble, can test the repeatability of the cheater. The middle frame shows that the ink disappeared simultaneously across the facet, indicating a consistent cheater setting. The right hand image points to a problem.