My Name is Bond…

It is easy to confuse metal bonded laps with sintered laps, at least until you get to the cash register. They look very similar, and they both have a cutting matrix consisting of diamond particles embedded in metal. This metal prevents tumbling and aggregation of the abrasive, and as it slowly wears, the matrix exposes more of the diamond particles.

Metal bonded laps have a thin layer of diamond, usually electroplated in place with nickel. With use, this thin layer breaks down and starts cutting like a finer grit. Sintered laps, on the other hand, have a very thick (3-6 mm) cutting matrix. To paraphrase the chelonian* cosmological ruminations of such luminaries as Bertrand Russell, Stephen Hawking, and Antonin Scalia, "it's diamonds all the way down." This contributes to a much longer life and steady, aggressive cutting performance.

Although no firm statistics exist on the long-term economics of metal bonded versus sintered laps, you can probably count on at least a factor of ten more cutting from the more expensive lap. In fact, a sintered lap can easily provide a lifetime of steady, reliable performance. At a cost only 3-4 times higher than the bonded variety, this can make a great deal of sense. On the other hand, for beginning faceters who are unsure about making a lifelong commitment to the hobby, such savings may never be realized.

*look it up. I had to.

RayTech produces the NuBond in three grits: 325 (coloured gray), 600 (brown), and 1200 (blue). Note, however, that these laps cut considerably less aggressively than their grit numbers suggest. In fact, you will get best results by considering the NuBonds to be one or more steps finer: the 325 cuts like 600-800, the 600 like 1200-2000, and the 1200 like 3000-4000. This softening of the cutting action is particularly noticeable once the surface of the lap has been broken in and takes on a glazed appearance. The original performance can be restored by RayTech's recommended procedures, but many hobbyists prefer the ultra-fine cut and pre-polish possible with a broken-in NuBond.

The 1200 grit NuBond lap is by far the most popular of the three, precisely because of the wonderful pre-polish that it can place on quartz and beryl. Every beginner's lap set should include that lovable blue disk (see Section 3.4 below). Expect to pay $100-150 for your NuBond lap, and expect to use it a lot.

Figure 3-5 The NuBond cutting laps have a composite resin matrix surface layer embedded with diamond.

A couple of cautionary notes deserve mention before you place your order. First, these laps are relatively thin and

flexible. Use them with a master lap to ensure consistent cutting results. Second, and more insidiously, the NuBond laps can produce pitting problems with gemstone materials harder than 7 on the Mohs scale (see Chapter 12.9). This phenomenon is normally called the "orange peel" effect in the online discussion groups, or the "@%#^$% orange peel effect" when it happens to you. Polishing out orange peel can be particularly wasteful of time and gem rough. You have been warned. You will be warned again on page 341.

Ultralaps for Cutting and Pre-Polish

The other common type of non-metal cutting lap is the Ultralap from Moyco Precision Abrasives Inc. Yes, the Ultralap. Not the standard beginner's cerium oxide polishing disk, but rather its diamond impregnated big brother. Ultralaps are available in a variety of abrasive types and grit sizes (see Section 3.3.2). Among these combinations are 1200 and 3000 mesh diamond – arguably pre-polish laps, but certainly capable of moving facet meets around.

The diamond impregnated Ultralaps are more expensive than those containing oxide polish, but at $10-20 each, you won't need to mortgage your home to give them a try. Installing and using these thin Mylar sheets is straightforward. See page 170 for pointers.

Although there are only two common non-metal cutting laps currently on the market, the field of composite materials evolves rapidly. Keep your eyes and ears open: there will inevitably be newer and better technologies available as these developments filter down to the amateur faceting world.

3.2.4 Why Use Permanently Charged Cutting Laps?

Beyond their obvious ease of use, permanently charged cutting laps offer a number of distinct advantages to the hobby faceter. First, and perhaps most importantly, the abrasive is uniform in both particle size and distribution over the surface of the lap. Hand charged metal laps can suffer from balling up of abrasive, to say nothing of the phenomenon of some diamond particles sinking deep into the metal, while others protrude above the surface. The result is uneven cutting and in the worst instances, bad scratches.

The second major advantage of permanently charged laps is that they have virtually eliminated the problem of cross contamination in the cutting process. Yes, you will hear stories of how a diamond grain or two broke loose from this or that manufacturer's lap and ended up causing problems at a later, finer cutting phase. Think about that complaint for a moment and hearken back to the days of loose abrasive grit cutting (see "True Grit" on page 63). We are in a different world.

The moniker "permanently charged" may be a bit of an exaggeration – these laps do wear out, after all – but they can, in fact, last a very long time. Exact lifetimes are difficult to judge, since different gem materials can have a radically different effect on your laps. Corundum, for example, exhibits a cutting resistance almost ten times higher than that of quartz (see Chapter 12.9.1), yet quartz has a well-deserved reputation for gumming up laps. Gem size also plays a role: a 10 mm gem has twice the surface area – and hence incurs twice the damage to your lap – as does a 7 mm stone of the same material and design.