The layers of a polymer-bound plate are somewhat water-resistant. This is an advantage because they are less sensitive to relative humidity (and its inherent nonreproducibility of R_f values) than were the gypsum-bound plates. They develop in the same manner, and results are the same (same separation and retention) in almost all cases. However, differences between hard and soft layer plates, and even between plates of the same type from different manufacturers, can occur because the silica gel and binders used are unique to each manufacturer. When changing from any type of TLC plate, the new plates should be run beside the old ones under identical conditions for a few days to compare results.

Another possible problem with the polymer-bound plate, but one that is easily overcome, is that detection reagents made up only in water will not wet the layers as easily as they do gypsum layers. This is seen when the totally aqueous reagent (originally developed in the age of gypsum-bound plates) is sprayed on a prepared plate. The solution does not penetrate as well, perhaps even running off the silica gel layer if it is sprayed too heavily. The remedy is to add 5% methanol or ethanol to the formulation. This decreases the surface tension of the reagent solution, and then penetration, whether application is by spraying or dipping, is instant.

VIII. TLC SUPPORTS

As mentioned above, suitable supports onto which any sorbent can be coated include glass, plastic, and aluminum. Analytical results on any plate will be identical regardless of the support, especially supports made by the same manufacturer. It should be noted that manufacturers of flexible layers (plastic and aluminum) often apply a thinner layer to these supports. This prevents the layer from cracking should the plate be bent too much.

Any support needs to be perfectly flat and clean to ensure that good, intact layers result. Most people are familiar with glass supports. These can be purchased in many different sizes from 20 × 20 cm to 2.5 × 7.5 cm. Fewer sizes are available in plastic- or aluminum-supported plates, but these are simply cut with scissors or straight edge–sharp blade combination, of which there are many today, including roller blade cutters (check your local craft store). When cutting with the straight edge and blade, the sorbent surface is laid face down on some clean paper.

Large glass plates that are prescored on the back can be purchased. This allows them to be broken down to a smaller size. This is a convenience and saves wasting a larger TLC plate on a few samples, minimizing the cost of analysis. Care should always be taken in breaking these plates to avoid getting cut by the glass. A special plier-like tool called a "running plier" or "grozier" that can make breaking prescored plates safe and easy is available from glass craft stores. It is a wide-nosed plier with a curved end coated with plastic (Fig. 12). Once the grozier is lined up with a score mark, a simple closing of the handles to apply pressure will snap the plate cleanly.

Glass-backed TLC plates stand up well in any TLC chamber. The plastic- (usually polyphthalate) and aluminum-backed plates need to be placed in a chamber at a sharper angle so they do not bend after being wetted by solvent. One distinct advantage of the flexible supports is that they can be cut to any size needed with scissors, razor blade, or roller cutter. They are usually placed face down on a cutting board or thick paper to be cut on the support side.

After cutting any plate from a larger plate, carefully hold the smaller plate and wipe the sides with a paper towel to remove loose sorbent clinging to the edges. If these random particles are not removed, they will act as wicks and will give crooked solvent fronts.

IX. RECENT TLC DEVELOPMENTS

The newest advances in TLC precoated layers include plates made with small-particle spherical silica gels with 60 Å pores. These are 6–8 μm and are applied to glass (0.2 mm thick layer) and aluminum (0.1 mm thick layer) supports. Because of their particle size, they are high-performance thin-layer plates. Their advantages include even more rapid separations (about 20% faster) and more compact spots compared to HPTLC plates made with irregular particles. Applications include