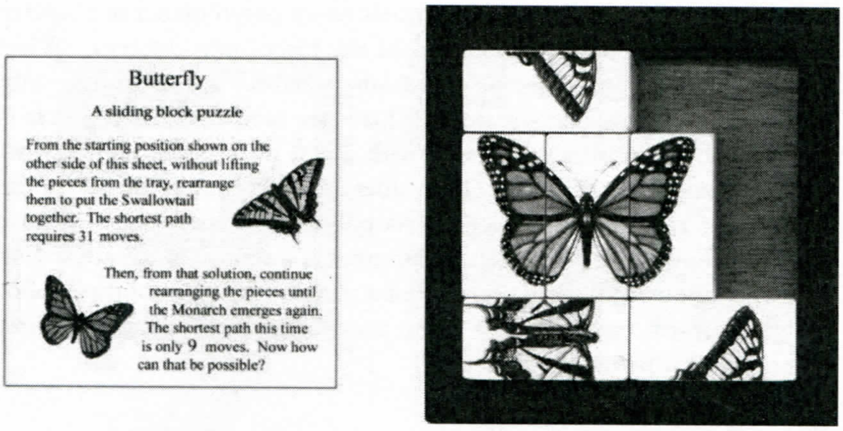

Figure 55.

start with the Monarch butterfly as shown on the left, and end up with the Swallowtail on the right. It requires 39 moves. But then to put the Monarch back together again may require only nine moves. How can that be possible? This puzzle was introduced at the International Puzzle Party in Helsinki in 2005, made of solid hardwood blocks, with the butterflies laminated on in their bright, contrasting natural colors, orange and yellow.

The remainder of the puzzles in this chapter might not be classified as true sliding block puzzles, but rather closely related variations. (This confusing matter of puzzle classification tends to be a puzzle in

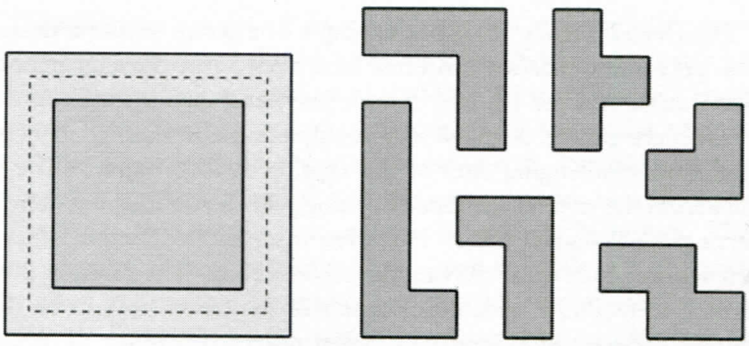

Figure 56.

itself!) *Window Pain* (Figure 56) consists of six polyominoes in a square 5×5 tray. The object is simply to fit the pieces into the tray. What makes it tricky is that the picture frame opening on the top is only 4×4. There is only one solution. (This is the simple version. There is another, more complicated version with a slot in one side of the tray.)

This next puzzle, *Looking Glass*, does employ a slot in the side of the square 5×5 tray through which the six polyominoes are inserted (Figure 57). The round hole in the plexiglass cover is simply to facilitate sliding the pieces about with the eraser-end of a pencil. The one solution is not straightforward, especially for some popular puzzle-solving computer programs, as it involves rotation.

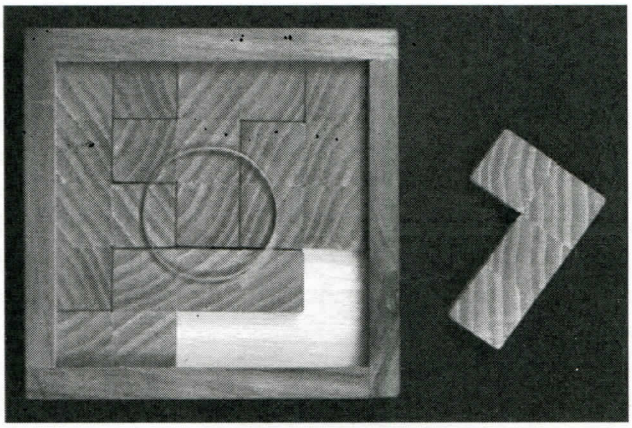

Figure 57.

The Decoy (Figure 58) is one example of a group of recent designs in which polyomino pieces are inserted onto a 5×5 tray through an opening in the transparent top (shown in dark gray) and then shifted about until the last piece can be dropped in to complete the assembly. This is one of the more challenging ones of this type, even to get apart. The name comes from the smaller L-shaped opening, which you might assume is for inserting the L-shaped piece. However, it serves no function other than as an access window for moving the pieces about. The solution involves rotation, to facilitate which the corners of the pieces need to be slightly rounded. There would seem to be great potential here for the discovery of many other new and clever combinations of pieces and openings.

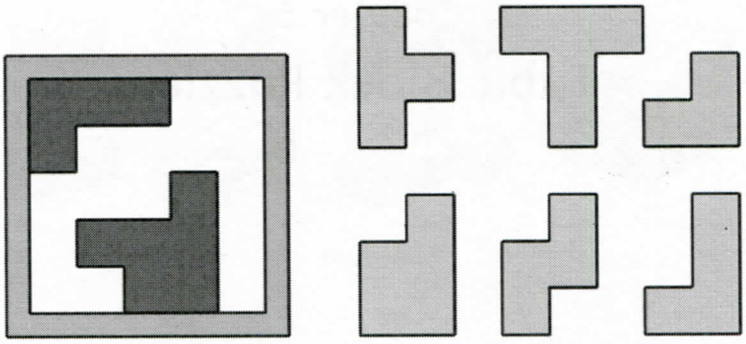

Figure 58.

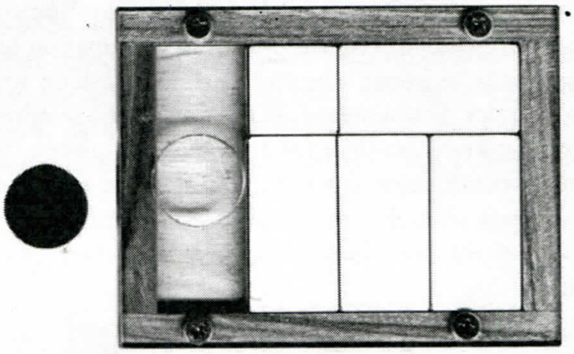

Figure 59.

The five-piece *Drop-Out Puzzle* (Figure 59) must be just about the ultimate in simplicity of sliding block puzzles. Four rectangular blocks and one square block are contained within a 3 × 4 tray with a transparent cover. The cover has a circular hole near one end, and the bottom of the tray has a corresponding hole at the other end. The object is to drop a round disk (ceramic magnet) into the top hole and, by shifting pieces about, have it drop out the bottom hole. It requires 26 moves. The fun begins when an attempt is then made to drop the disk in again to repeat the solution, for now the blocks are in a position that makes the solution impossible. Eight additional moves are required to restore them into a playable position.

Chapter 3
Misdirection-Type Puzzles

Most of the puzzle designs included in this book could probably be classified as mathematical recreations, even though very little math may have been involved in designing them, and even less needed to solve them. In this chapter, we make a slight digression into puzzles that depend for their cleverness more on psychology than anything else. First we will discuss what are called *Square-Root-Type* designs. The idea is not new, but little seems to have been published in the way of exposition or analysis.

It is just human nature to fit square objects into square corners. Not only have all of us been doing it for our entire lives, but also usually it is the only way that makes sense. It applies to everything from desk drawers and bookshelves to buildings and city blocks. Puzzle designers are always looking for ways to exploit these habits of ours. In the first example (Figure 48), five dissimilar pentominoes fit snugly into a square tray whose dimensions are four times the diagonal of the square building block. Any attempt to fit the pieces in orthogonally will not succeed, as there is only the one diagonal solution shown. Even when the secret is known, such puzzles can still be entertaining to solve.

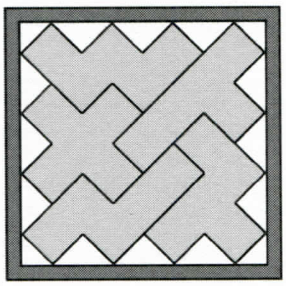

Figure 48.

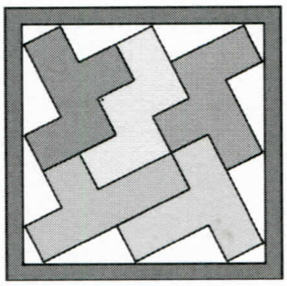

Figure 49.

The puzzle in Figure 48 goes by the uninspired name of *Design #176-A*. A slight design flaw is that two of the pieces are symmetrical. Better designs are surely possible. Goh Pit Khiam of Singapore has produced some very clever puzzles of this type.

When this sort of design trick becomes routine, the next step is to change the angle of attack to one even less obvious, as shown in Figure 49. Again, five pentominoes fit snugly one way only into a square tray, and you should be able to easily calculate the tray size. This one is identified as *Design #177-A*. This puzzle was produced in 2001 in fancy woods. Note that the uniqueness of the solution allows the assembled puzzle to be designed such that the colorful woods will always be arranged in a pleasing contrasting pattern, and the flatness of the assembly allows it to be sanded to a fine finish.

In spite of what was stated earlier about simplicity, sometimes even veteran puzzle designers who should know better get carried away by their cleverness. One example of such is the third and last puzzle in this group, shown in Figure 50. Here the angle is changed yet again. Furthermore, when placed first, not a single piece enjoys a stable resting place against

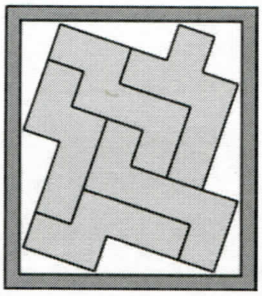

Figure 50.

the sides of the tray, considerably increasing the difficulty. The solution is believed to be unique. The biggest problem in designing puzzles of this sort is making sure that your intended solution is unique. There are computer programs that are useful to a degree, but sometimes unwanted solutions (called *incongruous* solutions) still turn up unexpectedly, usually with the pieces in a disorderly jumble.

Closely related to the above is a family of puzzle designs that use a two-sided tray. One such, called *Housing Project*, is shown in Figure 51.