INVESTIGATIVE FILES

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Helix to Heaven

The Staircase Stands but the Myth Falls

The CBS television movie "The Staircase" (April 12, 1998), told how "a dying nun's wish to complete her order's chapel is fulfilled by a mysterious stranger" (Bobbin 1998). Starring Barbara Hershey as the terminally ill mother superior and William Peterson as the enigmatic carpenter, the movie is an embellishment of the legend of the "miraculous stairway" at the Sisters of Loretto Chapel in Santa Fe, New Mexico. The wooden, spiral stair is thought to be unique, and some claim its very existence is inexplicable.

The Loretto legend begins with the founding of a school for females in Santa Fe in 1852. A combined day and boarding school, the Loretto Academy was established by the local Sisters of Loretto at the behest of Bishop John Lamy. In 1873 work began on a chapel. Unfortunately some earthly, even earthy events reportedly marred the work: The wife of Bishop Lamy's nephew caught the architect's eye and he was killed for his interest—shot by the nephew who was distraught over his destroyed marriage.

At this time work on the chapel was nearing completion and, although the choir loft was finished, the architect's plans provided no means of access. It was felt that installing an "ordinary stair" would be objectionable on aesthetic grounds and because it would limit seating (Bullock 1978, 6, 8). "Carpenters and builders were called in," according to one source, "only to shake their heads in despair." Then, "When all else had failed, the Sisters determined to pray a novena to the Master Carpenter himself, St. Joseph" (the father of Jesus) (Bullock 1978, 8).

"On the ninth day," reportedly, their prayers were answered. A humble workman appeared outside, leading a burro laden with carpentry tools. He announced he could provide a suitable means of access to the loft, requiring only permission and a couple of water tubs. Soon, he was at work:

> Sisters, going in to the Chapel to pray, saw the tubs with wood soaking in them, but the Man always withdrew while they said their prayers, returning to his work when the Chapel was free. Some there are who say the circular stair which stands there today was built very quickly. Others say no, it took quite a little time. But the stair did grow, rising solidly in a double helix without support of any kind and without nail or screw. The floor space used was minimal and the stair adds to, rather than detracts from, the beauty of the Chapel.

As the tale continues:

> The Sisters were overjoyed and planned a fine dinner to honor the Carpenter. Only he could not be found. No one seemed to know him, where he lived, nothing. Lumberyards were checked, but they had no bill for the Sisters of Loretto. They had not sold him the wood. Knowledgeable men went in and inspected the stair and none knew what kind of wood had been used, certainly nothing indigenous to this area. Advertisements for the Carpenter were run in the *New Mexican* and brought no response.
>
> "Surely," said the devout, "it was St. Joseph himself who built the stair" (Bullock 1978, 8, 10).

No doubt the legend has improved over the intervening century, like good wine. As we shall see, there is more to the story. But Barbara Hershey concedes, "Those who want to believe it's a miracle can, and those who want to believe this man was just an ingenious carpenter can" (Bobbin 1998). Evidence for the latter is considerable, but first we must digress a bit to understand spiral stairs.

Spiral and other winding staircases reached a high point in development in sixteenth-century England and France, with several "remarkable" examples ("Stair" 1960; "Interior" 1960). To appreciate the architectural and other problems such stairs present we must recognize that builders use *turns* in staircases to save space or to adapt to a particular floor plan. The simplest is the *landing turn* which is formed of straight flights joined at the requisite angle by a platform. A variation is the *split landing* which is divided on a diagonal into two steps.

Instead of a landing, the turn may be

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accomplished by a series of steps having tapered treads. Such staircases are called *winders* and include certain ornamental types, like that which takes the shape of a partial circle (known as circular stair) or an ellipse. An extreme form of winding staircase is a *continuous winder* in the form of a helix (a line that rises as it twists, like a screw thread). This is the popularly termed "spiral staircase" like the example at Loretto Chapel (Locke 1992, 135–36; Dietz 1991, 340–42).

Helixes—unlike, say, pyramids—are not inherently stable weight-supporting structures. They require some kind of strengthening or support. Therefore, in addition to being secured at top and bottom, the spiral staircase is usually also braced by attachment along its height to a central pole or an adjacent wall (Dietz 1991, 342; "Stair" 1960).

Unfortunately, spiral and other winding staircases are not only problematic in design but are also fundamentally unsafe. Explains one authority, "For safety, any departure from a straight staircase requires careful attention to detail in design and construction." Especially, "Because people tend to travel the shortest path around a corner, where a winder's treads are narrowest, the traveler must decide at each step where each foot falls. This may be an intellectual and physical exercise best practiced elsewhere. In short, winders are pretty but inherently unsafe" (Locke 1992, 135, 136). Other experts agree. According to Albert G. H. Dietz, Professor Emeritus of Building Engineering at MIT, Winders "should be avoided if at all possible. No adequate foothold is afforded at the angle [due to the tapering] and there is an almost vertical drop of several feet if a number of risers converge on the same point. The construction is dangerous and may easily lead to bad accidents" (Dietz 1991, 341). As a consequence, winders are frequently prohibited by building codes. That is especially true of the spiral stair, which "contains all the bad features of the winder multiplied several times" (Dietz 1991, 342).

Such problems seem to have beset the staircase at Loretto, suggesting that, at most, the "miracle" was a partial one.

Figure 1. The spiral stairway at Loretto Chapel in Santa Fe, New Mexico, is an alleged miracle of construction.

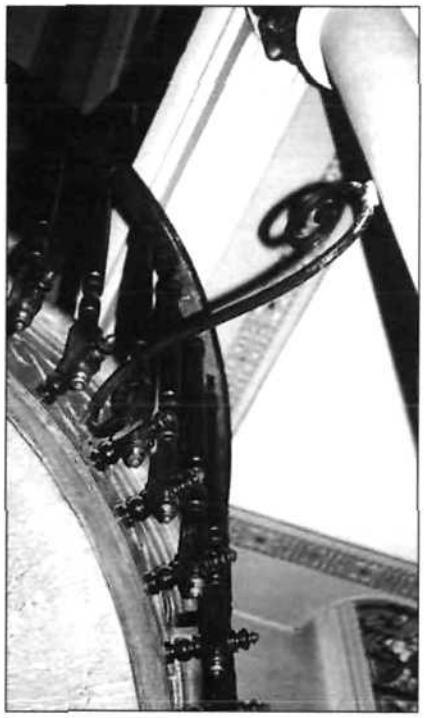

Figure 2. Iron support bracket (unmentioned in published accounts) reveals the "miracle" is a partial one. (Photos by Joe Nickell)

Safety appears to have been a concern at the outset, since there was originally no railing. At the time the staircase was completed, one thirteen-year-old sister who was among the first to ascend to the loft, told how she and her friends were so frightened—absent a railing—that they came down on hands and knees (Albach 1965). Nevertheless, despite the very real hazard, it was not until 1887—ten years after the staircase was completed—that an artisan named Phillip August Hesch added the railing (Loretto n.d.). No one claims it was a miracle, yet it is described as "itself a work of art" (Albach 1965; see Figure 1).

Over time, other problems arose relating to the double helix form. The helix, after all, is the shape of the common wire spring. Therefore, it is not surprising that people who trod the stairs reported "a small amount of vertical movement" or "a certain amount of springiness" (Albach 1965) and again "a very slight vibration as one ascends and descends rather as though the stair were a living, breathing thing" (Bullock 1978, 14).

Some people have thought the free-standing structure should have collapsed long ago, we are told, and builders and architects supposedly "never fail to marvel how it manages to stay in place," considering that it is "without a center support" (Albach 1965). In fact, though, as one wood technologist observes, "the staircase does have a central support." He observes that of the two wood stringers (or spiral structural members) the inner one is of such small radius that it "functions as an almost solid pole" (Easley 1997).

There is also another support—one that goes unmentioned, but which I observed when I visited the now-privately owned chapel in 1993. This is an iron brace or bracket that stabilizes the staircase by rigidly connecting the outer stringer to one of the columns that support the loft (see Figure 2).

There is reason to suspect that the staircase may be more unstable and, potentially, unsafe than some realize. It has been closed to public travel since at least the mid-1970s (when the reason was given as lack of other egress from the loft in case of fire). When I visited in 1993 my understanding was that it was suffering from the constant traffic. Barbara Hershey implied the same when

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tuations. In his book *Statistics as Principled Argument,* Robert Abelson (1995) sums this up nicely by urging readers to "give chance a chance." When you find yourself proclaiming something as meaningful and important, ask yourself whether you would accept someone else's idea on the same evidentiary basis.

Ask What Can Be Predicted. When you can only see meaning in data by looking backward, post-hockery is strongly indicated. You do not truly understand a phenomenon until you can generate testable predictions. Every one of the examples of unwarranted belief cited in this article could have been avoided if its creator had been challenged to make predictions. When someone makes a claim to knowledge ask, by way of evidence, "What can you predict?" Adding this simple habit to one's repertoire of critical thinking skills will help to clearly differentiate the context of discovery from that of verification. The ability to spot post-hockery in an argument, one's own or another's, is well worth a bit of practice.

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Notes

1. This by no means implies that the outcomes of shots are determined by chance. In fact, nothing could be further from the truth. A wide range of factors contribute to success: a player's baseline skill level, the difficulty of the attempted shot, the strength of the defense, and so forth. What the research does indicate is simple: if you had a complete listing of the causal factors determining the outcome of an attempted shot, the success of previous shots would not appear on it.

2. (1) 39 years. (2) 4,187 miles. (3) 13 countries. (4) 39 books. (5) 2,160 miles. (6) 390,000 pounds. (7) 1,756. (8) 645 days. (9) 5,959 miles. (10) 36,198 feet. □

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she stated, "It still functions, though people aren't allowed to go up it very often" (Bobbin 1998). It would thus appear that the Loretto staircase is subject to the laws of physics like any other.

The other mysteries that are emphasized in relation to the stair are the identity of the carpenter and the type of wood used. It seems merely mystery mongering to suggest that there is anything strange—least of all evidence of the supernatural—in the failure to record the name of an obviously itinerant workman.

As to the wood, that it has not been identified precisely means little. The piece given to a forester for possible identification was exceedingly small (only about 3/4-inch square by 1/8-inch thick) whereas much larger (six-inch) pieces are preferred by the U.S. Forest Service's Center for Wood Anatomy (which has made many famous identifications, including artifacts taken from King Tut's tomb and the ladder involved in the Lindbergh kidnapping) (Knight 1997). The wood *has* reportedly been identified as to family, *Pinaceae,* and genus, *Picea*—i.e., spruce (Easley 1997), a type of "light, strong, elastic wood" often used in construction ("Spruce" 1960). But there are no fewer than thirty-nine species—ten in North America—so that comparison of the Loretto sample with only two varieties (Easley 1997) can scarcely be definitive.

In the final analysis the "mysteries" of the spiral staircase at the Loretto Chapel are evidence, not of its miraculous production but instead of its human—quite fallibly human—manufacture.

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