The History of a Mid-19th-Century Hat Form: A Multiaxis Mystery

Ted Maust and Mark Sfirri

(*Left, middle*) Original 1840s hat form turned by Harman Baugh of Philadelphia using multiaxis techniques (side and front views).

Photos: Mark Sfirri

(*Right*) *Poke Bonnet*, 1830-40, silk

This 1830s bonnet serves as an example of what would have been made on forms similar to the one discussed in this article.

The Metropolitan Museum of Art, Gift of Mrs. Bernard H. Cone, 1937

This article is divided into two parts. First, Ted Maust discusses the history of Elfreth's Alley, a national historic landmark in Philadelphia's Old City neighborhood, and one of its residents, Harman Baugh, who made the hat mold discussed herein. Then, Mark Sfirri offers a seasoned woodturner's perspective on how the hat mold was made. It's a somewhat rare historical example of multiaxis turning.

Part I—Elfreth's Alley
Ted Maust

Today, Elfreth's Alley is a beautiful residential street popular with tourists and photographers. In the 18th and 19th centuries, it was home to artisans and laborers alike, as the slightly smaller lots (compared to nearby streets) provided affordable living and workspaces. While some of the artisans who lived and worked on the street left behind detailed records in the form of account books, many left only fleeting traces. I was delighted when a friend of the Elfreth's Alley Museum offered us a more tangible piece of the street's artisan history: a wooden bonnet form. Stamped on the bottom of the form was the name and address of the maker, "H. Baugh, Elfreth's Alley, Phila," leaving no question about the provenance of the piece. Researching this item, I have learned more about the working life of one of the 19th-century residents of the street, as well as bonnet-making technology of the era.

Elfreth's Alley


Photo courtesy Elfreth's Alley Association

(*Left*) Elfreth's Alley is a National Historic Landmark and has been a residential street since the early 18th century.

(*Right*) Close up of the hat form's bottom with the stamped signature: "H. Baugh, Elfreth's Alley, Philad."

Photo: Mark Sfirri

The name was already familiar to me; Harman Baugh bought two lots along Elfreth's Alley in 1836 and lived on the street until shortly before his death in 1876. During that time, newspaper clippings show he was an active member of the Masons and ran for public office several times, coming within 150 votes of state office. From city directories and United States Census records, I knew Baugh was a turner but had little record of his work.

Around the time I first saw this bonnet form, I found an 1843 newspaper advertisement running in the *Louisville Journal*:

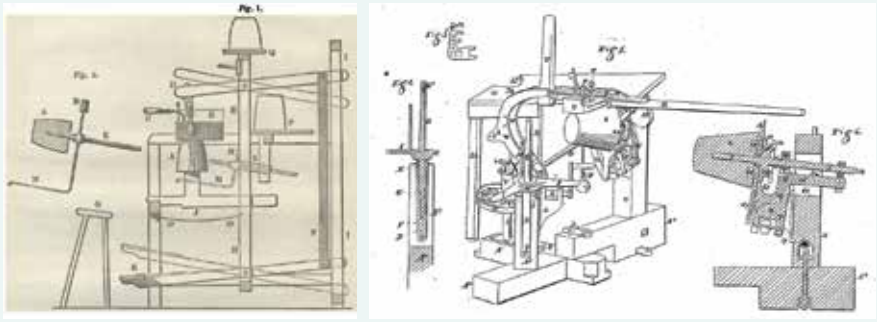
> TO MILLINERS
> The subscriber has now on hand and for sale at his old establishment, No. 10 Elfreth's Alley, running from Second to Front, and between Arch and Race streets, Philadelphia, a supply of newly-invented pressing machines, for pressing Ladies' Bonnets, which he offers for sale at reasonable prices, and which surpass anything of the kind ever to be offered to the public, for utility and convenience; he, therefore, respectfully solicits the patronage of those persons who may want such an article; and he flatters himself that after they have given his machines a fair trial, they will pronounce them far superior to any other. N.B. Hat and Bonnet Blocks, made to order, and carefully and promptly sent to any part of the country. Harman Baugh[1]

This ad helped me roughly date the bonnet form by showing that Baugh was making and selling bonnet blocks by 1843, but I was also left with more questions: how exactly did milliners make bonnets on these blocks and what did a "pressing machine" look like? I knew that similar molds were used to stretch and shape felt into hats with the use of steam, but I wasn't sure if that same method was applicable with this form and with other bonnet materials such as woven straw.

I began looking for more information about this "newly-invented" machine and found that in fact there were at least two bonnet-pressing machines invented in 1842, a year before Baugh's ad.

In March, the transactions of the Society, Instituted at London, for the Encouragement of Arts, Manufactures, and Commerce record that a prize was issued to a Vincent Price who had recently invented a machine for blocking straw bonnets. The contraption can be thought of as a workstation, where a blocker would apply heat to a straw blank onto a wooden block. Price himself was motivated to create this mechanism because he lived with a disability that made it ▸

Early hat-pressing machines



Nineteenth-century hat-pressing machines, by Vincent Price (left) and Richard Murdoch (right).

[1]Baugh, Harman, "To Milliners," *Louisville Journal*, Louisville, Kentucky, 16 March, 1843, page 3.

difficult to stand for long periods of time.[2]

In October 1842, a United States patent was issued to Richard Murdoch of Baltimore, Maryland. Both designs feature an essentially rectangular iron hanging from a boom that can be shifted up or down. Price's design allows the bonnet blocker to manipulate the height of this hot tool with a foot pedal, while Murdoch's uses a long wooden handle.

That iron is applied to the exterior of the bonnet material where it sits on a bonnet form. Both designs mount these forms at roughly a 90-degree angle, slid onto dowels. The blocker then uses one hand (or in Price's case, foot) to control the height of the hot iron, while using the other to rotate the bonnet form so that the entire circumference comes into contact with the iron. The physical exertion of this act is mitigated by the use of counterweights.

Modern-day milliner

In 2022, milliner Sydney Strickler of American Hats, LLC, makes a felt bonnet using Harman Baugh's 1840s-era multiaxis-turned hat form.

While the bonnet form today appears to many visitors to the Elfreth's Alley Museum to be a dirty, roughly-finished block of wood, Mark Sfirri's experimentations have shown that in fact it is a finely engineered tool.

An additional patent was granted in 1844 to another Baltimore resident, Caleb Merritt, who refined Murdoch's design by adding gears that allowed the blocker to rotate the bonnet form at a variety of angles.

All of the illustrations of these contraptions in patent records feature essentially conical bonnet forms, but they must have been able to accommodate more complex shapes such as the Baugh form. The shifting spur marks suggest that the process of creating this bonnet form was iterative, a collaboration between Baugh and a bonnet maker as they worked to create a fashionable bonnet shape in wood, primarily with a lathe.

My research shows that during Baugh's tenure living in Elfreth's Alley, there were at least five hat makers, or milliners, who also called this street home, and many more in the surrounding blocks and the greater city with whom he may have collaborated. This could have been a one-of-a-kind form, or the first of many, if Baugh received orders for them. Ultimately, we don't know how many bonnet forms Baugh created.

While Baugh's advertisement does not include a price, we can look at other turners' account books to get a sense of the going rate for such work. For instance, if we look at the account book (dated 1835 to 1843) of Daniel Danner, a turner working in Lancaster County, we see that he produced spinning wheels, tool shafts, and other products. Danner's accounts also contain records of his work for hatters. Indeed, there is even a record of Danner producing a couple bonnet blocks. He charged thirty-seven cents for one bonnet block, and one dollar for a bonnet block "with screws." For various repairs of hat blocks and bonnet blocks, he typically charged between eight and thirteen cents.[3] Prices for these services would have varied geographically, but Danner's account books give us a rough sense of what Harman Baugh might have charged for producing a bonnet block.

While the bonnet form today appears to many visitors to the Elfreth's Alley Museum to be a dirty, roughly finished block of wood, Mark Sfirri's experimentations have shown that in fact it is a finely engineered tool. It is an artifact that offers an entry point into considering a wide variety of historic topics—not only woodturning but the changing fashions of the 19th century, and the trade networks facilitated by newspapers of the time. Harman Baugh himself gives us a central character who not only was engaged in the working life of an artisan, but also threw himself into the Masonic order and into the political arena. As such, I think this is a fascinating object.

Following my research, I worked with American Hats, LLC, of Philadelphia to make a bonnet using this historic block. See process photo at left.

[2]Price, Vincent. "NO. III. Machine for Blocking Straw-Bonnets." *Transactions of the Society, Instituted at London, for the Encouragement of Arts, Manufactures, and Commerce* 54 (1843): 55–58.

Part II—A Multiaxis Mystery

Mark Sfirri

When Ted Maust and I began corresponding, he was interested to know how the hat mold was made. My first thought was that it was a spindle turning on a single axis and that the turning was then hand carved to create the asymmetry from the side view. But when I visited Ted and got to see the mold in person, that theory went out the window. Seeing the marks of the large 2¼" (6cm) two-pronged spur center in five different positions on the bottom was a big clue; another was that the top portion was 5" (13cm) tall in the back and only 4¼" (11cm) in the front. Had it been turned on a single axis, those dimensions would have been the same, which is to say that the outside corner of the top of the hat would have been parallel to the inside corner below it.

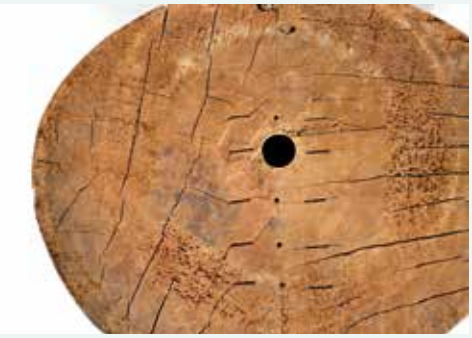
The mold was made of a close-grained hardwood, likely poplar or maple. The maker needed to glue up stock to make a block 12" (30cm) square and about 10" (25cm) long.

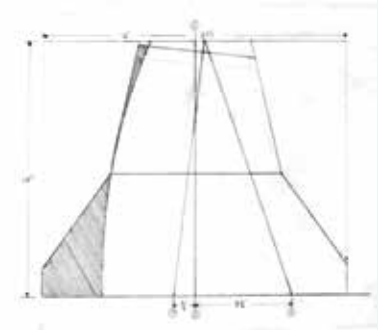
I was so intrigued with this object and how it was made, I decided to make a scale model of it to see if my understanding of it was correct. This was followed by a full-sized reproduction of it. I did not have the original mold as a reference when I was turning, but I did have photographs and had taken careful measurements. I also made a drawing of the bonnet mold to get the centers laid out and to draw the arcs of the turning. You can see the process photographs of it.

On the bottom of the mold, there is a ½" (13mm) hole, probably to fit on a stand, that corresponds with the center of the initial turning. The overall dimensions of the initial turning were 12" in diameter and 9" (23cm) in height. The other spur center marks are all in a line, which means that whichever of them were used would result in a finished piece that was bilaterally symmetrical from the front or back view.

There are three marks, potential centers, in a line in front of that first enlarged center. I could envision Baugh's thought process determining which center worked best for the design of the hat. By using a compass, I was able to figure out which of these was actually used to turn the back of the mold (the one furthest from the center). Likely, the one closest to the hole, about 1" (25mm) from it, was the first to be tested. It wasn't actually turned on that center but hand rotated while ▸

Multiple turning centers

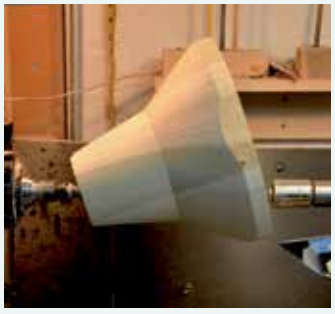




In studying the original form, the author determined that although a number of turning centers were evident on the bottom, only three were ultimately used to make the hat form. A subsequent drawing is made in preparation for turning a reproduction on multiple axes.

Photos: Mark Sfirri

Turning a hat form



The author turns a reproduction of the hat form using poplar on three sets of centers.

Photos: Mark Sfirri

Detail of top of hat form showing curved line in the back of the hat. The front and sides are straight lines.

Photo: Mark Sfirri

[3]Thanks to Valerie Seiber and Jake S. Dunnigan at The Hershey Story Museum for their research assistance, and to historian James McMahon, Jr. for his work on Danner in the Autumn 1993 issue of *Pennsylvania Folklife* magazine.

positioned on it to see what arc it would make; perhaps the turner used a pencil to scribe the arc. If that one were used, the curve would have extended the secondary form almost all the way around to the front and would not have achieved the desired effect. The curve was too similar to the radius of the initial turning. Baugh then probably tried the next center, about 1" further away. This was better but still not the proper shape. The fourth mark, the second center that *was* used, is 3⅜" (9cm) away from the first center.

The turning of the mold on these two sets of centers created an unwanted outside corner edge that required hand-shaping to blend the form from the back to the front. The shaping detail needed to be done on both sides of the hat in the back. Interestingly, one side has a shaped transition that is smoother than the other. Likely, the maker took time with the first one to get it right and rushed the second one because it was taking too long. I now understood the lower portion of the hat.

One thing continued to perplex me as I made my first, small-scale model: the top portion has a straight symmetrical tapered cone shape on either side and in the front, but not the back. The side view of the back is a continual curve that runs from the bottom to the top. It became clear that that portion of the top was turned on both sets of centers. What's odd is that the very top of the hat mold is perfectly round, 4" (10cm) in diameter. I realized that I needed to turn it to about 4½" (11cm) on the first set of centers. After I turned the curve on the second set of centers, the top was no longer a circle. Since there is only one center toward the back of the hat at the bottom, it was clear that it was the center used to make the top of the mold tilt forward and was used for the top of the hat only. I also kicked the top center forward about ⅜" (9.5mm) to center the circle at the top a little better. After turning it, I needed to draw the 4" circle at the top and then hand-shape it entirely, in order to make it perfectly round and to re-establish the straightness of the form on the front and sides.

I decided to make a full-sized version out of poplar. After it was completed, I took it to the Elfreth's Alley Museum and Ted Maust and I compared it with the original. The original weighed 8.2 lbs.; mine weighed 8.4 lbs. I chalk up the added weight to moisture content and the copy's absence of a hole in the bottom. Looking at a chart of weights per board foot of different possible woods, there just aren't any that are close to poplar, at 2.58 lbs. per board foot, that can be considered real possibilities. I'm convinced that the original was made of poplar.

Baugh likely used a large lathe that had the capacity to turn architectural columns. I base this assertion on the enormous size of the spur center and the fact that the necessary swing was 16½" (42cm) above the banjo for the toolrest for the first part of the turning, and 18½" (47cm) for the main offset center. While a 20" (51cm) swing on a lathe is more common nowadays, I doubt that it was back then. Even as recently as the 1970s, a 12" swing was more or less the standard for a commercial lathe.

When I began exploring multiaxis turning in the mid-1970s, I thought that it was a new thing. It wasn't, although I have not seen a lot of examples in wood. Legs for a cane-back chair, jigged to allow the tops and bottoms to be angled to one another, date to the 1660s. The pad foot leg, which appeared in 1700 in North America and in England, was basically a poor person's ball-and-claw foot. It's an example of turning part of the form on two sets of centers, and it's an amazing design. What surprises me is why whoever designed and engineered it didn't expand on that idea to create other forms. Fast forward to 1840, Baugh's use of multiaxis turning was a subtle, effective, and apparently innovative achievement. While I was working on the models, I felt that I was channeling the mind of a turner from 175 years ago. ■

Original vs. reproduction

Comparison of the original and Sfirri's full-sized reproduction. Note the consistent negative space between the objects.

Photos: Mark Sfirri

Ted Maust is the former Director of the Elfreth's Alley Museum in Philadelphia.

Mark Sfirri has been experimenting with multiaxis turning for nearly fifty years. He maintains a wood studio near New Hope, Pennsylvania.