

DIE TRIALS

Insights into the U.S. Mint's Medal Production

Exposition specimens reveal new areas of research for medal collectors.

TWO UNUSUAL U.S. Mint “die trials” of the official medal struck for the 1894 California Midwinter International Exposition caught our eye and piqued our curiosity. (Die trials are test impressions of an unfinished or completed die in a soft metal, such as lead.) The medal, cataloged by Harold E. Hibler and Charles V. Kappen as “so-called dollar” HK-245, depicts the California State Seal—Minerva with a standing bear, a miner, a San Francisco Bay scene and a stylized Diablo Range in the distance. Thirty-one stars represent California’s place in the roll call of states, and its motto, EUREKA, completes the image. The reverse bears a simple combination of lettering and numerals.

Die trials, such as those described here, were thrown in the trash, or mint employees could purchase them for their metal value. The die trials survived in uncirculated condition, allowing for close study. Not only do they re-



veal the steps in die production, but they also raise questions worthy of further research.

Die Trial Strikes

Die trials are not common, but they do exist. The specimens shown here are full-press strikes of the medal in copper using both obverse and reverse dies. The reverse die is identical to that used for production strikes of the Midwinter Expo medal. The obverse is unfinished on Die Trial 1, which lacks the lettering and stars, but it bears incused “scribe lines” to guide the placement of design elements by the die-maker, who used individual hand punches.

The second die trial stumped us. The stars are incuse, and EUREKA is an incuse mirror image of the lettering. Did a mint worker accidentally apply the punches to a die-struck medal instead of the die? Did he use a struck die trial to practice punch placement before punching the master die? Or, did something else happen that explains the two trial pieces?

▲ **ALTHOUGH THE TWO DIE TRIALS** have the same State Seal design, the scribe line, lettering and stars on Die Trial 2 (bottom) were blunders.

Actual Size: 39mm

PHOTOS: TODD POLLOCK

With no direct documentary evidence, how can we attribute the California dies to the U.S. Mint?



PHOTOS: WILLIAM HYDER & JEFF SHEVLIN

▲ **THE OBVERSE DESIGNS OF DIE TRIALS 1 AND 2** differ slightly from the design of the official 1894 California Midwinter International Exposition medal.

Actual Size: 39mm

We might expect random mistakes to happen at private mints, but author and researcher William Swoger reports that U.S. Mint Chief Engraver Charles E. Barber designed the medal. Swoger offers no citation for this statement, and we have been unable to confirm Barber's involvement. The design is similar to the official medal struck by the mint at the 1892 World's Columbian Exposition in Chicago. As late as 1914, Barber praised the design combination as simple and the bestselling issue of the mint's exposition medals. The Midwinter piece clearly fits the mint style of the 1890s.

Making the Connection

With no direct documentary evidence, how can we attribute the California dies to the U.S. Mint? While we have not found documented confir-

mation of the mint's involvement, we know that a contractor for the U.S. Department of the Interior struck the official medals at the exposition. We also know for certain that George Morgan designed the dies for the 1892 World's Columbian Exposition, another U.S. Mint product. The two exposition medals (California and Chicago) are similar, with a pictorial obverse and textual reverse.

Engravers and shops had their own distinctive letter punches, which often help determine who made the dies. A close examination of the 1892 World's Columbian Exposition medals and the 1894 California Midwinter International Exposition specimen reveals that the dies were created with the same set of letter punches. The dies for the 1892 Columbian medal definitely are mint products;

The die trials show the faint, raised lines shadowing the mountains and Minerva's head and helmet.



◀ **A CLOSE EXAMINATION** of the lettering on the World's Columbian Exposition medal (top) and the 1894 California Midwinter International Exposition piece shows that the dies were created with the same set of letter punches, which means that both likely were U.S. Mint products.

thus, it follows that the dies made with the same letter set also were manufactured by the mint. Since the U.S. government contracted the 1894 medal, and since it shares the same design as the 1892 Columbian medal designed by Morgan and uses the same letter punches, we accept that the 1894 medal dies are a mint product, regardless of Barber's involvement in its design.

One and the Same

A careful examination of the reverse dies of the 1894 official medal and the die trials demonstrates that the reverse dies are the same. How can we tell? Inspection reveals slightly offset punches of the "4" in the date, the H and E in the word THE in the outer inscription, and the E in SHINE in the outer inscription. The 4 in the date and the E in SHINE can be seen easily on high-grade pieces.

How can the incomplete Die Trial 1 obverse be explained? Mint records reported by numismatic author Robert Julian in his 1977 book *Medals of the United States Mint*, published by the Token and Medal Society, and the 2013 synthesis of primary and secondary records describing mint operations, compiled by Roger Burdette in his 2013 book *Mine to Mint: American Coinage Operations and Technology, 1833 to 1937*, it appears that the California seal was copied from federal records available to the mint's artists at the time. Based on mint practices, as reported by Burdette and Barber's 1896 description of making medals and reprinted by Julian, we know the mint artist likely prepared a to-scale sketch of the California State Seal. The prepared die of the appropriate size was coated with hard transfer wax. The pencil drawing was attached to the wax surface, and a stylus or other burnishing tool was used to transfer the carbon lines to the wax surface. The outline of the design was transferred into the soft steel using a graver.

Stray, Raised Lines

By 1894, the mint's staff was employing several methods to create dies, but the die trials suggest the initial matrix die was carved by hand. The die trials show the faint, raised lines shadowing the mountains and Minerva's head and helmet. In addition, numerous stray lines run vertically and at odd angles through the relief. These appear to be lines created to guide the design as the die was being engraved, as well as the marks made as the engraving progressed.

The remaining traces of the rough design outline in the field were erased in the final die polishing. The lines in the relief could not be removed by simple polishing without dulling the details of the relief. If a reducing lathe had created a positive hub or master die, the random lines would not be present.

Burdette documented that the alternative to hand engraving would be to start with a bas-relief



▲ **THE DIE TRIALS** and the repunched letters on HK-245 demonstrate that the finished reverse was used for production strikes. The numeral "4" is the most distinctive feature found on worn examples of the Midwinter Expo medal.



The die trials might have been made to test the placement of the stars and letters before applying them to the master die.



▲ **TRACES CAN BE SEEN** of the first sketch lines inscribed into the soft steel of the master die prior to the image being engraved. The lines were polished out as the working die for the California Midwinter International Exposition medal was being finished.

model and use a reducing machine to engrave a matrix die. If a reducing machine had created the die, concentric lines (left as artifacts of the stylus) might remain, but a mechanical lathe process would not create random vertical lines. Regardless of the process used to create the relief image, the die would be used to create a matrix hub. Any touch-ups or design details could then be made on the hub. We cannot determine whether any work was done on the hub at this point.

The California State Seal element was unfinished based on the many stray, raised lines scat-



▲ **NOTE THE MANY SCRATCHES** scattered across the surface of the obverse. These would later be removed when the working hub or working die was being finished. (The lines are not present on HK-245.)

tered across the relief details. A new working die should have been made using the matrix hub. The die then was inscribed with guidelines to facilitate the addition of the text and stars. Die Trial 1 shows the guides in the field. Had the lines been inscribed on the working die, the lines would have been raised on the die trial.

Instead, the lines must have been inscribed on the matrix hub before the working die was created. Removing any doubt about the validity of this assertion, the top-most incuse line (that guided the placement of EUREKA) bends where it meets the crest of Minerva's helmet and follows the raised device for a short distance. If the lines had been made on a die instead of a hub, the stylus would have dipped into the incused portion of the helmet.

The Punches

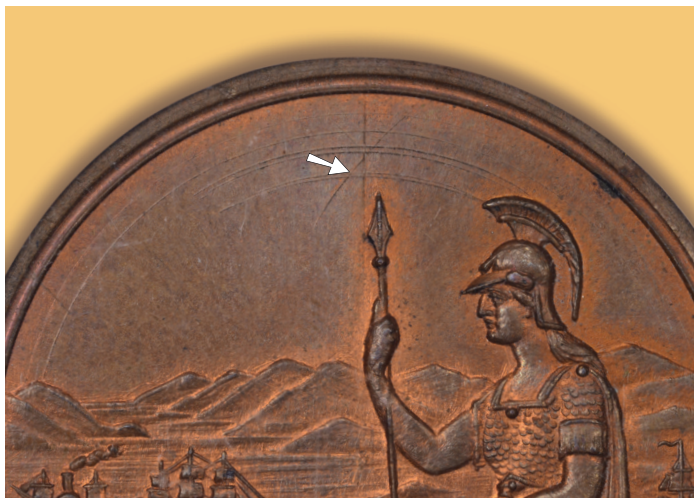
The second die trial with the incuse lettering and stars requires further speculation to adequately explain. The die trials might have been made to test the placement of the stars and letters before applying them to the master die. Looking again at the piece, the person placing the punches started on the right near the mountaintop behind Minerva's back and worked to the left. The placement was too tight, and the last star on the left ended well short of the opposite mountaintop.

The placement of EUREKA had its own problems. The U was punched too low and then punched slightly higher and to the left. Traces of the scribe lines can be seen in the bottom portion of most of the letters, with the exception of the initial letter E and final A. Since the scribe lines are incuse on the die trial, they had to have been made on the matrix hub. If the letter punches had been applied to the working die, the raised scribe lines on the working die would have been obliterated by the punches, not to mention that EUREKA would not be mirrored and all the punched elements would be raised, not incuse.

The engraver must have applied the stars and lettering directly to the hub as an alternative to practicing on a die trial. Barber's description of the medal die preparation process does not mention testing the placement of letters and other punches on die trials. If the latter were produced for the purpose of practicing the placement of punches, then we have documented an additional step in the preparation of dies. The preservation of two die trials would suggest that multiple



The preservation of two die trials would suggest that multiple strikes were made for testing.



▲ **A CLOSE-UP VIEW OF DIE TRIAL 1** shows the inscribed guidelines on the obverse.

strikes were made for testing.

The alternative of using the punches on a hub would represent a major blunder. It seems unlikely that Barber or Morgan would make such a mistake, implying that the die production had been assigned to a novice assistant engraver or die-maker. The punches likely were applied to the hub, and the error was discovered when Die Trial 2 was struck. The reverse die on the second die trial is rotated a few degrees to the left. If the two die trials had been struck at the same time, the reverse die alignment should be the same on both medals.

The first scenario implies that the engraver eventually applied the punches to the working die; finished engraving and cleaning up the State Seal detail; and polished out the various guidelines remaining in the field. The completed die then could have been used as a master die to make a new master hub and working dies. More likely, the finished die became the one production die available for use at the California Midwinter International Exposition.

Only one set of working dies might have been made. Four pairs of medal dies were created for the Chicago World's Columbian Exposition, which was a larger event that ran for nearly two years, rather than six months. These four die pairs are distinctive in minor details, including obverse lettering size, obverse element details, and the position of lettering on the reverse dies. The differences indicate that each set of dies was made separately, starting from a partially completed matrix die. Perhaps the differences in the

Chicago medals point to Charles Morgan's creation of the rough matrix die, leaving the completion of working dies to an apprentice or assistant.

The second alternative—applying punches to the matrix hub—would require the production of a new matrix hub and working die. The latter then would have been finished following the same process outlined above.

We cannot distinguish conclusively between the two alternatives. The first implies that die trials were struck to test the placement of punched elements prior to completing the working die. This would be a step not previously documented.

Was the matrix hub botched? Perhaps. We do know it was hand engraved by either Barber or Morgan. The two die trials imply that the working die was then passed off to a less-experienced assistant or die-maker to prepare and finish.

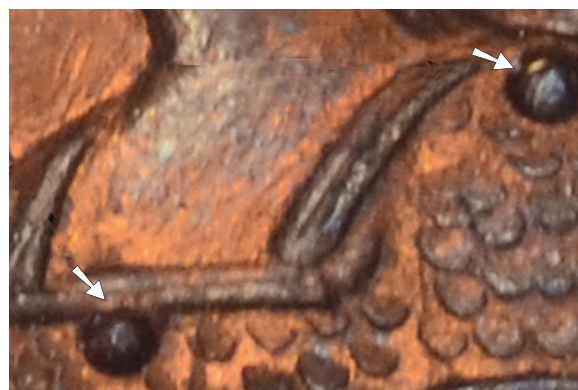
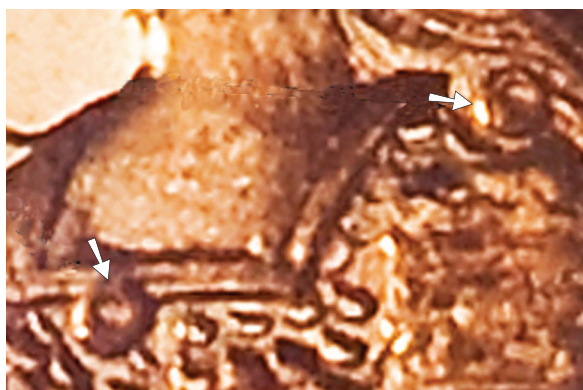
We could conclude that the original hub was modified to make a new working die if the punches had been applied to the die trial instead of the hub. If the punches were applied to the original hub, then a new matrix hub was made from the matrix die before the design was modified and a new working die was made. A new matrix hub likely was produced from the original matrix die, and the hub was finished before making a new working die.

How do we know modifications were made to the hub? The clasps on Minerva's breastplate at the top of the chest and the shoulder are solid on the die trials and hollowed out on the finished



▲ **INCUSED STARS AND A MIRRORED "EUREKA"** were included on the obverse of Die Trial 2 (shown), but not on Die Trial 1.

Many of the raised design elements are softened on the finished die, suggesting that the engraving lines were buffed out on the hub.



▲ **THE HOLLOWED-OUT CLASPS** on Minerva's breastplate as shown on the struck California Midwinter International Exposition medal (left) differ from those on the die trial (right), indicating that modifications were made to the hub.

medal. The change could only have been made with a small punch applied to the positive clasp on the hub. In addition, many of the raised design elements, such as the ripples in the water, are softened on the finished die, suggesting that the engraving lines were buffed out on the hub before a working die was created. Rigorous buffing could have required touch-ups, such as punching out the clasps.

J.W. Ewing, a U.S. Department of the Interior contractor, struck gold-plated medals on the opening day of the California Midwinter International Exposition with the same type of press used by the mint. The gold-plated medals sold for \$1, an expensive purchase at the time. Later medals were struck in brass and sold for a more reasonable 25 cents. The gold-plated specimens, the first struck from the mint dies, allowed us to make our detailed comparisons with the die trials.

Further Research

The San Francisco firm of L.H. Moise made a version of the medal that is nearly identical to the Midwinter Expo medal, except it used an alternate version of the State Seal popular in California at the time. Moise probably made his medal to profit from sales outside the exposition grounds. Is it possible that the one pair of working dies failed at some point, and Ewing contracted with Moise for new dies? If Ewing used Moise's dies, they were returned to Moise following the exposition. (They were later used for other products, including Moise's own storecards.) To date, we have not encountered any official medals with die cracks that might indicate die failure.

(Die cracks are found on World Columbian Exposition medals, providing evidence that they did wear out.)

The two die trials discussed here continue to provide insight into practices at the Philadelphia Mint. Hopefully, our findings will reveal new areas of research for medal collectors. ■

SOURCES

"The Bill Weber Collection of So-Called Dollars and \$50 Slug Facsimiles." Holabird-Kagin Americana Auction #2 (2008).

Burdette, Roger W. *From Mine to Mint*. Great Falls, VA: Seneca Mill Press, 2013. (ANA Library Catalog No. GA80.B8m)

Hibler, Harold E., and Charles V. Kappen. *So-Called Dollars*. New York: Coin and Currency Institute, 1963, 2008. (RM30.H5)

Hyder, William D. "California Midwinter International Exposition: 1894 Medals, Badges, and Miscellaneous Exonumia." *TAMS Journal* (May 2009).

Hyder, William D., and Jeff Shevlin. "The Golden Age of California State Celebrations." *The Numismatist* (December 2010).

Julian, R.W. *Medals of the United States Mint*. El Cajon, CA: Token and Medal Society, 1977. (RM15.J8)

Swoger, William. *National Commemorative Medals of the United States Mint Since 1873*. Lake Odessa, MI: author, 2008. (RM70.S9)