

# COIN World

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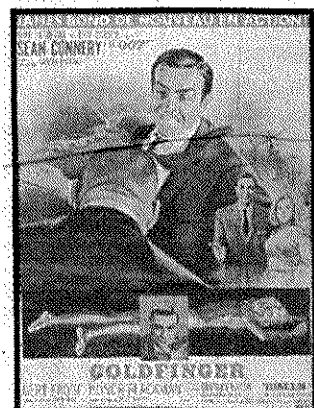
## 'Goldfinger' preview for Treasury officials gives birth to Mint, General Motors roller press testing

Workers on joint project share recollections of 1960s experimental pieces

By Eric M. Larson  
Special to COIN WORLD

No published account, recent or past, of the various experimental coins struck on the General Motors roller press includes detailed viewpoints of "hands-on" insiders — the people who created this unusual device.

My father worked at the General Motors Technical Center in Warren, Mich., where the press was developed and some experimental issues were struck during the 1960s. As the head of administrative services at Manufacturing Development Staff (the Tech Center division which created the roller press) he knew about the project and arranged interviews with several former Tech Center employees who worked on it. They are the primary information sources for information in this article. Additional information was obtained from contemporary *Coin World* articles, and former U.S. Mint Chief Sculptor-Engraver Frank Gasparro.



**GOLDFINGER** movie poster (French version) brought \$504 in February auction in California. (Photo courtesy of Executive Investments Co.)

I've decided to make this information public because of its interest to coin collectors, to address speculations about the project, and because, as time passes, it can only become more difficult to establish a valid and reliable historical record. Of the 50 or so GM employees who originally worked on the project at the Tech Center, fewer than a dozen are still alive, and all are more than 70 years old. None wished to be publicly identified, but virtually all believed it was

important to tell their part of the story of the machine that Mint Director Eva Adams once declared "will be the greatest development in the art of minting that has been made in the last 2,000 years."

There's a straightforward explanation why so little is known about this project: The new coin machine was a failure.

Is it unusual that employees of any organization — be it the Philadelphia Mint or General Motors Corp. — aren't anxious to talk about a project which failed and whose top executives wanted to succeed? I don't think it's unusual. Upon reflection, I don't believe most people will think it odd, either.

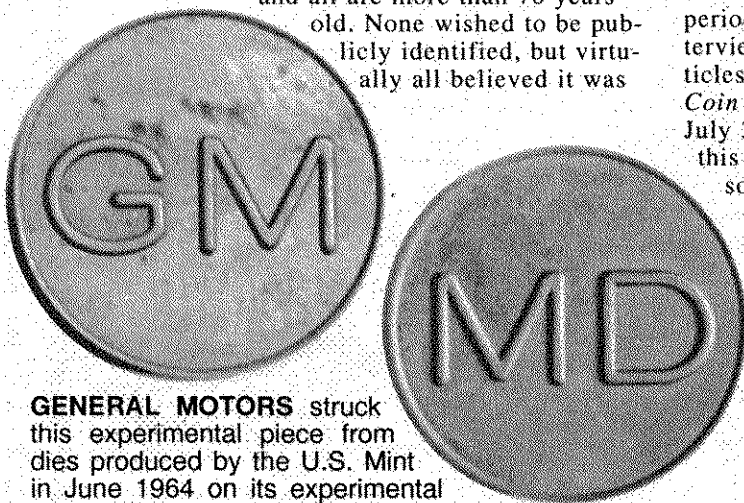
I began this research after reading an article in the November 1994 issue of *COINage* magazine, in which author Thomas K. DeLorey mentioned the so-called "Lady Head" piece and attributed it to GM. I vaguely remembered the project and that some trial pieces had been struck, but thought they'd been designed after the Lincoln cent — not a "Lady Head."

This account isn't comprehensive, because none of the former Tech Center employees I was able to locate had worked on the project continuously from beginning to end. Those who worked on it only at the beginning were unaware that "Lady Head" pieces were struck; those who worked on the project only toward the end didn't know that any Lincoln head pieces were made. Nevertheless, I was able to reconstruct a fairly complete account of the roller press and the various issues it produced. Future research may identify other valid and reliable evidence about the project.

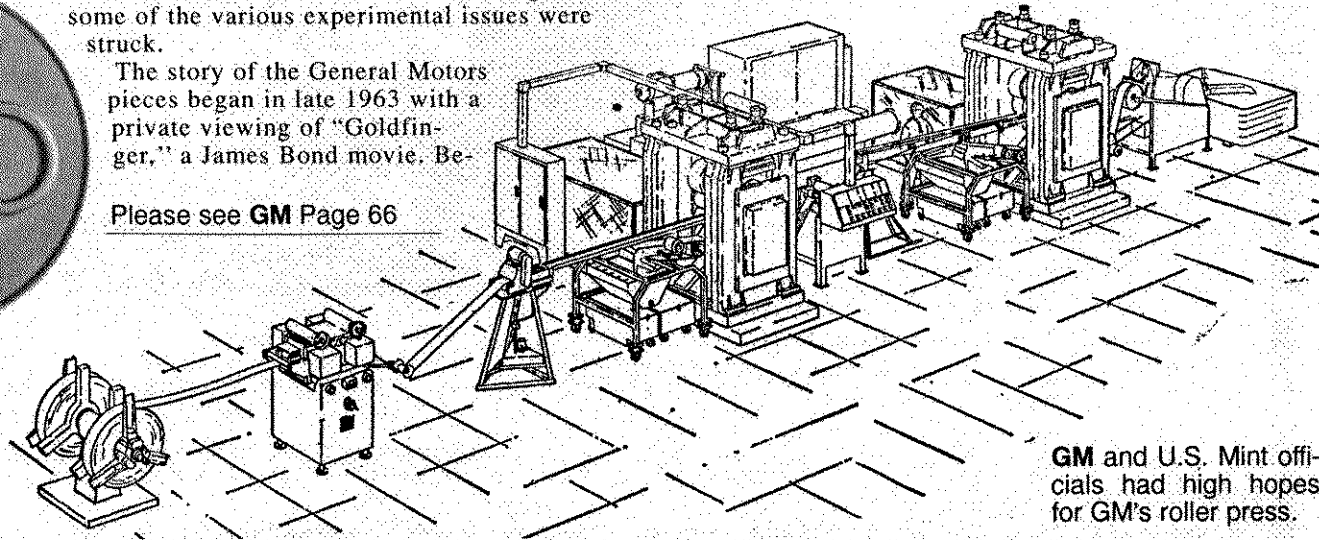
Q. David Bowers published the initial results of my research in the May/June 1995 issue of *Rare Coin Review*. But I continued to gather data. Meanwhile, more information appeared in an article published in the May 1995 issue of *Coins* magazine, in which author Eric von Klinger quotes information about the roller presses from annual Mint reports and other sources, and identifies dates consistent with the time periods cited by former Tech Center employees I interviewed. Further information was available from articles about the roller press which appeared in the *Coin World* issues of June 11, 1969; Aug. 27, 1969; July 30, 1969; Jan. 7, 1970; and April 22, 1970. All this information contributed to establishing when some of the various experimental issues were struck.

The story of the General Motors pieces began in late 1963 with a private viewing of "Goldfinger," a James Bond movie. Be-

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**GENERAL MOTORS** struck this experimental piece from dies produced by the U.S. Mint in June 1964 on its experimental roller press. The obverse features GM, with the MD on the reverse representing GM's Manufacturing Development division. Later pieces bear a sandblasted portrait of Abraham Lincoln, and were also struck from dies provided by the U.S. Mint.



**GM** and U.S. Mint officials had high hopes for GM's roller press.

## FRN changes over past years include inks, engraving depth

By Michele Orzano  
COIN WORLD Staff

While collectors of U.S. paper money await the issuance of new designs for Federal Reserve notes, the Bureau of Engraving and Printing continues to experiment with paper, ink and other aspects of producing Federal Reserve notes.

In the summer of 1994, U.S. Treasury officials announced the BEP would begin testing certain anti-counterfeiting devices — paper, ink, printing techniques — in anticipation of the release of an updated design for the \$100 FR notes in 1996.

But long before the Treasury announcement in 1994, there had already been changes made to the paper, to printing techniques as well as the addition of anti-counterfeiting devices.

Changes to the depth of the intaglio engraving were most recently made in 1986. The depth of the engraving was reduced from 60 to 120 microns to 40 to 80 microns. According to a BEP spokeswoman, the changes to the depth was made to optimize the printing on the water wipe presses. Intaglio printing produces notes with a three-dimensional look. In addition, the effect of this printing method cannot be produced photographically.

Intaglio plates have crevices etched into them so that the ink can sink deep into the grooves. When paper makes contact with the plate under extreme pressure, the ink is forced into the paper. The series of lines produce an embossed effect which can be felt with the fingertips.

By 1990, the U.S. Treasury Department introduced two devices said to help prevent counterfeiting — a Mylar security thread and microprinting around the note's portrait vignette.

The security thread runs vertically — top to bottom — to the left side of the portrait. The thread repeats USA and the numeral or name of the denomination. The microprinting repeats THE UNITED STATES OF AMERICA in type too small to be reproduced by photocopyers.

One of the most recent changes happened in July 1993 when the BEP converted to a neutral-cure paper. The reason for the change was the po-

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cause "Goldfinger's" plot included a break-in at Fort Knox - a U.S. Mint facility - Treasury Department officials requested (and got) a special preview before the film was commercially released in 1964. These Treasury Department officials invited friends - including some top GM executives - to join them.

After viewing "Goldfinger," a Mint executive grouched about the then-current coin shortage, and a GM executive responded that GM could build a machine that could mint 10,000 coins per minute.

Those off-hand remarks ultimately resulted in the striking of various experimental copper issues, some apparently unique in the history of U.S. coinage. The reason is that they bear the motif of an official U.S. circulating coin and were struck on behalf of the government, outside a U.S. Mint facility, using dies supplied by the government.

The project was unusual from the beginning, for several reasons:

First, it actually began as an informal collaboration between GM and the Philadelphia Mint, which was created by private discussions between their top executives shortly after the private viewing of "Goldfinger." This collaboration "wasn't a straight purchase contract," a former Tech Center employee stressed. "It was a cooperative venture. Both GM and the Mint contributed money and resources. This was different from how GM normally did business." The project was routed to the General Motors Technical Center in Warren, Mich., which was and still is GM's industrial research facility. It was assigned to Manufacturing Development Staff, then one of four major technical divisions within the Tech Center.

Second, it wasn't every day that a private company got the chance to strike experimental coins using dies supplied by the government. The only other known instance was in 1942, when the Mint supplied dies for use by private companies as part of a search for alternative materials in which to strike the Lincoln cent during World War II.

Third, the project represented a top GM executive's promise to create a new machine. "That also wasn't how things were typically done," a former Tech Center employee stated. "Our practice was to first evaluate the existing machine to see if we could improve it - to speed up production, its output quality, or whatever. In this case we didn't do that. We usually don't build a new machine without studying the old one first, because new machines are very expensive to design and build."

Teams of designers, machinists, engineers, chemists, metallurgists, electrical engineers and other specialists worked to create the first roller press - a small, electrically-driven prototype machine. Contrary to some accounts, the prototype machine was not hand-operated. The prototype machine was used as a model for the full-sized roller press.

The machines' designs were based upon what manufacturers term a "roll forming press," with blanking punches and coin dies mounted on the faces of opposing metal cylinders. It was designed to mint finished coins by punching out coin planchets and striking them almost simultaneously from a continuous coil of sheet copper fed between the rollers.

The machine had three rollers, and operated as follows:

First, after being straightened, a continuous strip of cent-grade sheet copper from a coil was fed between

the top and middle rollers. The top roller contained blanking punches which cut out planchets and seated them in cavities in the middle roller, which contained obverse dies as well as the mates to the blanking punches affixed in the upper roller. The blanking punches also formed rims of uniform height on the planchets. (The significance of this feature is discussed later in this article.)

Second, the planchets were rotated into alignment with sets of reverse dies on the bottom roller.

Third, during the extremely small fraction of a second in which the obverse and reverse dies were in direct vertical alignment, each coin was "struck" by approximately 50 tons of compression.

Fourth, the finished coin remained in the second roller until an eccentric cam activated the obverse punch behind the coin to eject it from the collar into a sorting bin. Each individual die pair had its own bin.

Because a simple rolling action would elongate the coin in the direction of rolling, the reverse die had to be fitted with a joint, or "knuckle," so that the resulting coins would be round.

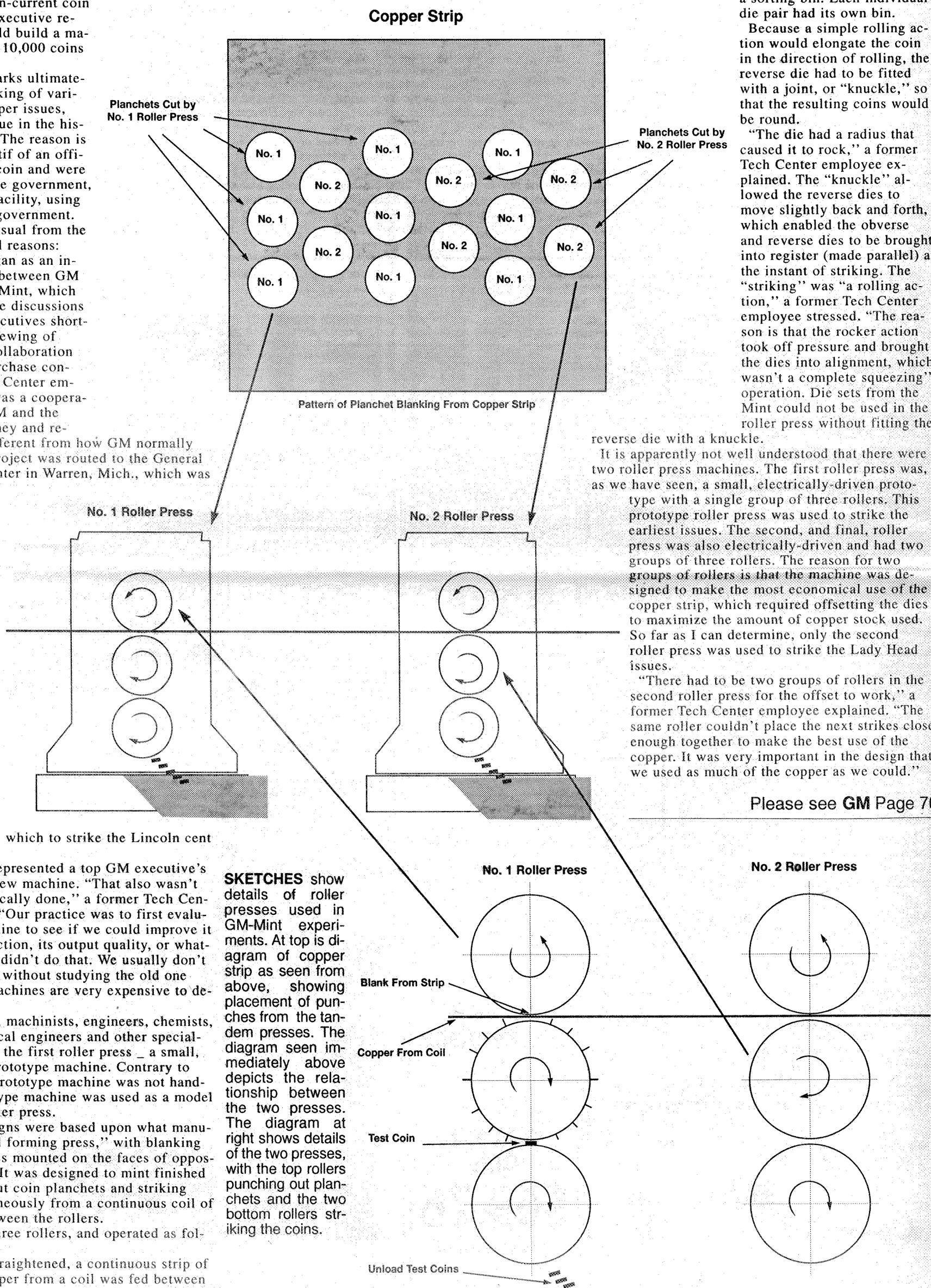
"The die had a radius that caused it to rock," a former Tech Center employee explained. The "knuckle" allowed the reverse dies to move slightly back and forth, which enabled the obverse and reverse dies to be brought into register (made parallel) at the instant of striking. The "striking" was "a rolling action," a former Tech Center employee stressed. "The reason is that the rocker action took off pressure and brought the dies into alignment, which wasn't a complete squeezing" operation. Die sets from the Mint could not be used in the roller press without fitting the

reverse die with a knuckle.

It is apparently not well understood that there were two roller press machines. The first roller press was, as we have seen, a small, electrically-driven prototype with a single group of three rollers. This prototype roller press was used to strike the earliest issues. The second, and final, roller press was also electrically-driven and had two groups of three rollers. The reason for two groups of rollers is that the machine was designed to make the most economical use of the copper strip, which required offsetting the dies to maximize the amount of copper stock used. So far as I can determine, only the second roller press was used to strike the Lady Head issues.

"There had to be two groups of rollers in the second roller press for the offset to work," a former Tech Center employee explained. "The same roller couldn't place the next strikes close enough together to make the best use of the copper. It was very important in the design that we used as much of the copper as we could."

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**SKETCHES** show details of roller presses used in GM-Mint experiments. At top is diagram of copper strip as seen from above, showing placement of punches from the tandem presses. The diagram seen immediately above depicts the relationship between the two presses. The diagram at right shows details of the two presses, with the top rollers punching out planchets and the two bottom rollers striking the coins.

He repeatedly described the operation, but I couldn't understand it. He drew three diagrams, illustrated with this article, which helped me and I believe will help others also.

According to a *Coin World* article published in the Aug. 27, 1969, issue the coin stock the Mint supplied for the roller press was 5 inches wide and .048-inch thick. One 2-ton coil (95 percent copper and 5 percent zinc) yielded 350,000 cents. It was to be fed through the roller press at 100 feet per minute.

So far as I have been able to establish, no complete records exist which describe all of the issues struck by the two different roller presses. GM's records of the project apparently were destroyed many years ago; but even if such records existed, they would be virtually unavailable to any private researcher. Queries as to whether the Philadelphia Mint still holds any of the GM pieces or records of the project had not been responded to by Mint officials prior to publication of this article.

The first three issues can be definitively identified because they were documented at the time of their original production at the Tech Center. Later issues apparently were not so documented; consequently, their date(s) of production are, at best, estimates.

The first three issues, which I've arbitrarily termed Varieties 1 to 3 in this article,

"So far as I have been able to establish, no complete records exist which describe all of the issues struck by the two different roller presses."



**FIRST VARIETY** of Lincoln head experimental piece was struck on GM roller press in August 1964. This is the second variety of test; it followed the GM/MD piece struck in June 1964.



**SECOND VARIETY** of Lincoln head experimental piece was struck in January 1965. It differs in slight ways from the first Lincoln piece. It is the third variety overall.

were produced by the smaller prototype machine. Thousands were struck from rolls of cent-grade sheet copper the Mint provided. After being struck they were gathered in buckets, locked in Mint-supplied steel chests, and shipped to Philadelphia for examination.

Variety 1 was struck in June 1964, with a plain edge, in medal alignment. The letters GM are centered on the obverse, MD on the reverse, and each side has a very thin rim of uniform width. MD refers to the Manufacturing Development division, which was renamed Manufacturing Development Staff later in 1964. Two known examples have been documented. One is 0.800-inch in diameter and weighs 63.8 grains; the other is 0.801-inch in diameter and weighs 64.2 grains. The height of the rims on both issues is uniform.

Variety 2 was struck in August 1964, with a plain edge, in coin alignment. The obverse bears a relief image virtually identical to the Lincoln cent device. The word STAFF is centered on the reverse, with the words MANUFACTURING and DEVELOPMENT centered approximately .0625-inch below and parallel to the rim at 12 o'clock and 6 o'clock, respectively. One known example has been documented. It weighs 61.6 grains and is 0.790-inch in diameter.

The Variety 2 obverse has the image of a Lincoln cent whose inscriptions (IN GOD WE TRUST, LIBERTY, and the date) were removed, and the Lincoln device sandblasted to remove fine details. The sandblast effects are recognizable under magnification, but in high areas the device is not fully struck, and the field is smooth. The rims on Variety 2



"After a thorough investigation of all coinage operations, Mint and General Motors officials agreed on Aug. 13, 1964, that a coin roller should be developed. A contract for one coin roller for \$500,000 was signed July 25, 1965."

are wider than on Variety 1, but are not of uniform width on either side. The rims' partially struck inner boundaries indicate they would have been as wide as those on Variety 3, had they been fully struck. Viewed edge-on, the height of the rim on Variety 2 is uniform around the circumference of the issue.

Variety 3 was struck in January 1965, with a plain edge, in coin alignment. It is virtually identical to Variety 2, except that it is of greater diameter and weight. The Lincoln device is slightly larger, in higher relief and more detailed. The obverse rim is rounded and both rims are fully struck, except for a small flat portion on the obverse side directly beneath the Lincoln device. One known example has been documented. It weighs 72.1 grains and is 0.813-inch in diameter.

The larger device on Variety 3 may have resulted from a heavier strike than was used to produce Variety 2, a die that was less worn, or both. The sandblast effect on Variety 3 is recognizable under magnification, the device is fully struck, and the field is smooth. The rim beneath the Lincoln device is flat rather than rounded, apparently because the blanking punches which formed the rims were out of register (not parallel). The reverse rim is fully struck, and of uniform width (about .046-inch). The rim height is uniform around the circumference of the issue.

How the dies for the Lincoln head issues were produced was a matter of some interest at the time, but remains unclear. "We thought they were made from used Lincoln cent dies," one former Tech Center employee said. "The reason is that dies are very expensive to make, and these had been sandblasted. Why go to the expense of making a new die and then sandblast it? It wouldn't have made sense to spend money to make new dies, if the dies were only used for testing purposes. We thought they removed the inscriptions [IN GOD WE TRUST, LIBERTY and the date] from used dies, and sandblasted the Lincoln image to keep it from being an exact reproduction" of a circulating coin.

The GM/MD token and Lincoln head issues were struck, a former Tech Center employee stated, "only to prove out the manufacturing process. Those pieces weren't designed as coins," he said. "They were



**SECOND SPECIMEN** of first variety of GM roller press test strike was struck in June 1964. Just two specimens are known (the other is depicted on Page 1).



deliberately made larger than a Lincoln cent, and designed so they could never be mistaken for or used as circulating coins. We needed something to strike to see if the machine would work."

There apparently were few written agreements documenting the collaborations between GM and the Philadelphia Mint during most of this early (1963-65) period. An April 22, 1970, *Coin World* article states: "After a thorough investigation of all coinage operations, Mint and General Motors officials agreed on Aug. 13, 1964, that a coin roller should be developed. A contract for one coin roller for \$500,000 was signed July 25, 1965."

The *Coin World* article provides circumstantial evidence, but not proof, that the quality of Variety 2, struck in August

1964, was considered satisfactory enough to proceed with additional work. The comparatively higher quality of Variety 3, struck in January 1965, may have been the basis for the July 25, 1965, contract. Eric von Klinger wrote that a "demonstration for the Mint" took place at the Tech Center on Nov. 2, 1965. "It was evidently a success," he concluded. "GM was given a green light to build a production model beginning in 1966."

It is likely that at least one additional Lincoln head variation was struck during 1965. Whether it played a role in the July 25, 1965, contract is unclear, but it could have.

**To be continued in  
June 5 issue**

**Eric M. Larson** is a researcher who has had a long interest in the GM roller press experimental pieces.

### General Motors Roller Press Experimental Pieces

#### Variety 1:

**Obverse: GM**

**Reverse: MD**

**Weight: No. 1, 63.8 grains; No. 2, 64.2 grains**

**Diameter: No. 1, 0.800-inch; No. 2, 0.801-inch**

**Die Alignment: Medal**

**Date Struck June 1964**

**Where Struck: General Motors**

#### Variety 2:

**Obverse: Lincoln portrait from 1-cent coin, image sandblasted, IN GOD WE TRUST, LIBERTY and date removed.**

**Reverse: MANUFACTURING DEVELOPMENT STAFF**

**Weight: 61.6 grains**

**Diameter: 0.790-inch**

**Die Alignment: Medal**

**Date Struck August 1964**

**Where Struck: General Motors**

#### Variety 3:

**Obverse: Lincoln portrait from 1-cent coin, image sandblasted, IN GOD WE TRUST, LIBERTY and date removed**

**Reverse: MANUFACTURING DEVELOPMENT STAFF**

**Weight: 72.1 grains**

**Diameter: 0.813-inch**

**Die Alignment: Medal**

**Date Struck January 1965**

**Where Struck: General Motors**



# GM-Mint roller press experimental pieces unique bit of American numismatic history

## Shortened die life leads to cancellation of promising press project

By Eric M. Larson  
Special to COIN WORLD

It took a private viewing of a James Bond movie for Treasury officials and General Motors executives to trigger one of most interesting experimental coining presses in minting history: the GM roller press, which General Motors officials said would be able to

### Second of Two Parts

strike 10,000 coins a minute.

The chance remarks made during a viewing of the movie "Goldfinger" — with a climactic sequence at the Treasury's Fort Knox Gold Bullion Depository — led to a unique event in U.S. Mint history: the production of experimental pieces bearing an image of a circulating coin, the Lincoln portrait from the cent, struck on Mint dies by a private company.

In last week's installment, we examined the operation of the experimental roller press produced by General Motors, which used dies provided by the United States Mint to strike several experimental pieces.

In *United States Patterns and Related Issues*, Andrew W. Pollock III identifies two "one cent" pieces, which most former Tech Center employees and Mint Chief Sculptor-Engraver Frank Gasparro said are correctly attributed to General Motors. One of them, No. 4055, a Lincoln head issue, was originally documented in an article by Ken Potter in the March 13, 1993, issue of *Coin World*. It reportedly weighs 3.52 grams, has a diameter of 20.5mm, and shows evidence of alterations. Because Potter originally documented it, I'll refer to it as the Potter specimen.

The Potter specimen is described as possibly made of "powdered metal," or "a base metal core (probably zinc) plated with 'powdered metal,'" and having a "dash-like symbol" above Lincoln's head whose significance, if any, is unknown. Two "X-shaped marks ... cut into the field in front of and behind Lincoln's head" are obvious mutilations. The reverse of the Potter specimen bears MANUFACTURING, DEVELOPMENT, and STAFF inscriptions, but differs from the Variety 2 and 3 reverses because they are positioned much closer (about .015-inch) to the rim. Also, while the Variety 2 and 3 reverse fields are otherwise blank, on the Potter specimen the word STAFF is

"inscribed within a rectangular cartouche at the center," with five dots centered horizontally and approximately equidistant in the field between the top of the rectangle and bottom of the letter C in MANUFACTURING. The Potter specimen has a rounded obverse like Variety 3, and its rim is likewise flat below the Lincoln device — probably because the blanking punches which formed the rims were out of register.

The Potter specimen was certainly struck after January 1965, but when? Because its reverse is comparatively fancier, the Potter specimen may have been chosen for a demonstration example over Variety 2 or 3, possibly sometime in July 1965 or on Nov. 2, 1965. Without inspecting the original contract(s) or access to other information, it is difficult to determine what role(s) the "successful" demonstration strikings played in determining when production of the second roller press was to begin. In my judgement, the Potter specimen was struck sometime during February to November 1965, when von Klinger reports that the Mint gave GM "a green light to build a production model beginning in 1966."

One former Tech Center employee recalls: "I know there were different sets of dies for the machine because they all came and left through [the] shipping and receiving [department]. I don't remember all the details of however many different dies were used or their designs, but I know there were several sets of dies."

Do the five dots on its reverse mean that the Potter specimen was struck from the fifth set of dies supplied by the Philadelphia Mint, and that some intermediate die variety — a Variation 4 — exists? Nobody I talked with said they knew.

Because the Potter specimen bears evidence of alterations and its composition has been questioned, it is relevant to determine if there is a reasonable explanation for its present condition.

Two issues have emerged:

1. That the Potter specimen is possibly made from "powdered metal" or some other metal, such as zinc; and

2. The nature of the alterations, which apparently consist of at least two different types of finish or plating. Most of the former Tech Center employees I interviewed said they believe that the

Potter specimen was struck at the Tech Center from coin-grade sheet copper supplied by the Mint, plated with electroless nickel at the Tech Center, and further altered in a manner that may be impossible to determine without a professional metallurgical analysis. It would have been extremely unlikely, several former Tech Center employees stated, for someone to have fed a different material (i.e., zinc) through the roller press.

Such observations are explained by the fact that powdered metal was evaluated as coin stock in a study performed before even the prototype roller-press machine was designed. It was rejected because cost was prohibitive. So no such issues were struck at the Tech Center. During 1964-65, copper was about 72 cents per pound (453.59 grams), which, when minted, yielded about 143 Lincoln cents of standard weight (3.11 grams), accounting for some material normally lost during the minting process. Powdered copper, depending upon its type, was two to three times more expensive than ordinary copper.

Powdered metal (usually copper or iron) the consistency of confectioners' sugar — finer — is used to manufacture automobile parts of complex design. This is done by sintering (heating metal until it is nearly molten), enclosing the powdered metal in a die, and striking it with approximately 100 tons of pressure. (About 50 tons of pressure were required to strike a Lincoln head issue from sheet copper using the roller press.) The forces of striking and sintering cause the particles to become a solid mass, and the resulting product weighs about the same as cast or rolled metal.

Zinc was not considered for use as coin stock, nor were other metals or alloys. All of the former Tech Center employees I interviewed said they believe it would have been virtually impossible for anyone there to have fed zinc through the roller press. "The only metal we ever used was rolled copper the Mint supplied," one stated, and the remainder affirmed this belief. "The roller press was kept in a secluded location, and it wasn't readily accessible," another



**LADY HEAD** experimental piece was struck on GM roller press using Mint-provided dies that resemble cent dies in placement of design elements. (Photo courtesy Ken Potter)



**NONSENSE LEGENDS** were used on roller press pieces. The figure resembles a young Queen Elizabeth II somewhat. (Photo courtesy Ken Potter)

explained. "You had to have a special pass to get into the building, and another one to get into the room where the roller press was located. This was a very special machine, and not just anybody could get access to it. The security around the machine was very tight."

Some Lincoln head issues were plated with electroless nickel at the Tech Center, outside the regular coin project, as personal souvenirs. "Electroless nickel" refers to an uncommon chemical plating process which doesn't use electrodes, and was being used in experimental work in plating chrome on steel car bumpers. "Chrome won't stick directly to steel," a former Tech Center employee explained. "The only thing chrome will stick to is nickel, but nickel won't stick directly to steel either. You have to first plate the steel with copper, then with nickel, and then with chrome."

One Lincoln head issue, a Variety 3, is known to have been holed and plated, and left the Tech Center as a trinket on a charm bracelet. The total number of Lincoln head issues that were nickel-plated is unknown, but probably was extremely small.

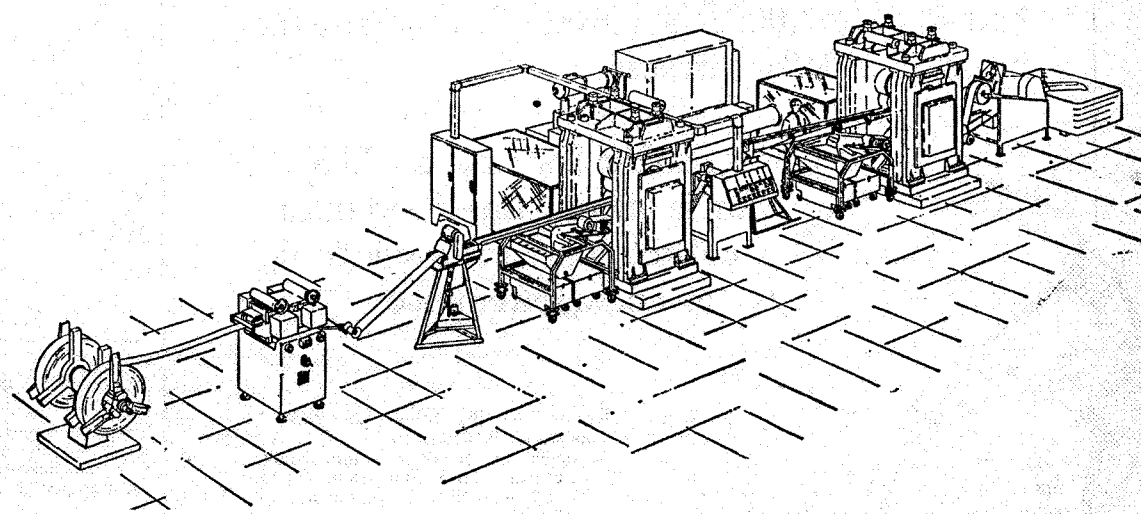
The Potter specimen is probably one of several that were nickel-plated at the Tech Center, and later re-altered in some manner. "I don't remember that particular reverse design, because I never kept track of them," one former Tech Center employee declared, after looking at a color photograph of the Potter specimen. "But if you compare it [the Potter specimen] with the other pieces, I'd believe it came out of the Tech Center. Who else could have designed and made a piece like that? I can't believe somebody could have made it up [counterfeited it] outside the Tech Center. How would they know what it looked like — with the design and that style of lettering? Why would they bother to do it? How could they do it? You can't just 'make' a coin like that in your back yard."

The most well-known GM piece is the second one listed in Pollock's book, No. 4060, termed the "Lady Head" or "Young Woman's Head" issue. A former Tech Center employee said: "It was a non-descript coin designed especially for our use." In conversation he constantly referred to it as both the

Please see **GM** Page 71



**SPECIMEN DISCOVERED** by Ken Potter resembles the Lincoln head experimental pieces struck on the GM roller press, but differs in composition. (Photo courtesy Ken Potter)



**GENERAL MOTORS** experimental roller press was supposed to strike 10,000 coins a minute after it punched planchets from copper strip fed between a series of rollers. Instead, the project was canceled after the press experienced excessive die wear and breakage.

“Young Queen Elizabeth” and the “Princess Elizabeth” issue, an indirect but interesting link to its British association. (An English author, Ian Fleming, wrote the book, *Goldfinger*, upon which the 1964 movie “Goldfinger” is based.)

“When you look at the coin, it looks like Queen Elizabeth facing left,” he said. It was he who originally recollected the James Bond connection, which all the other former Tech Center employees I talked with confirmed. “You’re right,” another former Tech Center employee stated. “I’d forgotten about that. The ‘Goldfinger’ part makes this an interesting story. If they hadn’t seen the movie, the machine probably never would have been built.”

The obverse of No. 4060 bears the design of the head of a young woman, with the non-sense inscriptions LYPPE ES MSOR, SIKHTE and ODI substituted for IN GOD WE TRUST, LIBERTY, and the date, respectively. Two known examples each weigh 3.11 grams and are 19mm in diameter – the same as a standard Lincoln cent from the 1964-69 period. “This coin was scientifically designed to produce the same amount of metal movement required to strike a Lincoln cent,” a former Tech Center employee recalled. “It was an attempt to see if the roller press could strike a Lincoln cent.”

The GM engineers and designers discovered another difference between the Lincoln cent and GM issues. The GM issues had rims of uniform height. “This was completely unanticipated; it certainly wasn’t planned,” a former Tech Center employee stated. “It resulted from the process of punching out the cent blank first, and forming the rim at the same time. When cent blanks are punched out at the Mint, another operation – called ‘upsetting’ – is necessary to form the rims. On the roller press, the ‘upsetting’ operation was eliminated, and saved a step in the minting process.”

One former Tech Center employee noted: “If you stack up a pile of cents with the bust of Lincoln facing the same direction, you’ll see there’s a gap between the rims of the coins in some places. That’s because the movement of the metal, in forming the bust of Lincoln, pulls metal away from the rim of the coin. On the roller press piece, that didn’t happen because of the way the cent blank was punched. The metal didn’t pull away from the rim of the coin the way it does on a Lincoln cent. If you stack up a pile of the GM pieces, with the bust in the same direction, you won’t see any gap between the rims.”

But the roller press didn’t perform as envisioned. “Using that kind of a machinery design to strike coins just didn’t work,” a former Tech Center employee recalled. “We had all kinds of overheating problems. The oil vaporized like a cloud around the machine from the heat when we ran it, and it sounded like a hail storm. It was a very noisy machine.” Other major reasons included: inability to operate at high speeds for sustained time periods without uneven strikes and excessive die breakage; oil required to lubricate the dies leaked onto the sheet copper and, during striking, created a “pebble surface” on the issues; and a complicated unloading device which didn’t do a good sorting job, so broken dies and defective issues they struck could not be readily identified and replaced.

The “pebble surface” resembles an effect that some people might interpret as damage, because the specimens are otherwise virtually pristine. On two specimens of the Lady Head issue that otherwise grade Uncirculated and About Uncirculated, respectively, with nearly 100 percent original Mint luster, the “pebble surface” is on the obverse above and extending to the LYPPE ES MYSOR inscription. It appears as though, in this area, the edge of the rim of each issue has been scraped across extremely coarse sandpaper, but that actually is not the case. These effects occurred during the minting process.

The letter-and-number codes hand-lettered onto the obverses of many known Lady Head pieces correspond to individual dies. “We put those codes on the faces of the dies at the Tech Center so we could identify exactly which coin came from a particular die,” a former Tech Center employee said, but – like all the other former employees I talked with – was unable to recall exactly how many dies were used on the second machine. “Whatever number of dies there were had to have been divisible by six,” he said, “because there were two sets of rollers that used dies in rows of three across. There could have been 72 dies, but I just can’t recall.” It also seems probable that the earliest Lady Head pieces would not have any “codes,” since the pieces would have had to have been struck in the first place to know if the unloading devices would work properly.

“Coins are supposed to be perfect,” one former Tech Center employee pointed out. “An imperfect coin becomes a keepsake, a collector’s item – and that defeats the purpose of coins. A minting operation needs to be set up so that when dies break or coins are defective, the defective coins and dies can be immediately detected and removed.” The “sustained, high pressures” involved in producing 10,000 coins per minute “caused dies to crack; torque on the [die] shafts caused twisting [of the dies] – and the dies needed constant lubrication. But the oil leaked from around the dies onto the copper. Striking a coin through oil causes a pebble surface on the coin, and that is unacceptable. Also, each die had a separate unloading device, which was just too complicated; the devices didn’t work right, and there was a significant problem in identifying which dies produced which coins, which was why we coded the dies. There were too many die failures. A .75-inch steel die just could not hold up under all that sustained, constant pressure. The fact is that design, that technology, that application, didn’t work for striking coins. The pressures on the dies simply exceeded the physical capability of the machine to operate at high rates of speed for long, continuous time periods.”

Exactly when the Lady Head issues were struck at the Tech Center is unknown, but probably could not have been earlier than 1966, and most likely was 1967-68. The reasons are that the dates von Klinger identified, dates cited in contemporary issues of *Coin World*, and recollections of various former Tech Center employees, indicate a 1967-68 time frame. General Motors, von Klinger wrote, “was given a green light to build a production model [of the roller press] beginning in 1966.” It is likely that constructing a full-sized machine probably took some time. It would have been impossible to construct the machine between November 1965 and January 1966. It seems probable that it would have taken at least a year to design and build the full-sized roller press.

It also seems likely that only Lady Head issues were struck on the second roller press, because none of the former Tech Center employees I interviewed who worked on it during the last part of the project could remember anything but the Lady Head pieces being produced. Similarly, other former Tech Center employees who worked only with the prototype roller press recalled that it struck only the GM/MD and Lincoln head pieces.

When the last Lady Head issues were struck at the Tech Center is unclear, but information from von Klinger, a *Coin World* article, and one former Tech Center employee, indicates it was no later than 1968. The latest the Lady Head issues could have been struck “was around March 1968, because that coincided with a vacation abroad that I took,” the former Tech Center employee recalled. “When I got back sometime in April 1968, the next month, the machine was gone

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Please see GM Page 72



— it had been shipped to Philadelphia.”

In his article, von Klinger reports that General Motors delivered the roller press to the Philadelphia Mint in December 1968, as does a *Coin World* article of April 22, 1970. This information, which was gathered independently, identifies conflicting dates when the roller press was shipped from GM, but also that it is unlikely that any Lady Head issues were struck at the Tech Center after 1968. (The roller press could have been returned to the Tech Center for additional work, and re-shipped to Philadelphia in December 1968.)

Some Lincoln cent specimens were struck on the roller press on Aug. 14, 1969, in Philadelphia, at the opening for the new United States Mint, but what happened to them afterwards is unclear at this time. Quoting an unidentified issue of the *Numismatic News*, von Klinger states in his article in *Coins* magazine that “the press runs, while of production type, were trial operations, and the cent specimens would not be released to circulation.” These pieces are probably worth a separate story. According to von Klinger, and a Jan. 7, 1970, *Coin World* article, Assistant Secretary of the Treasury Eugene T. Rossides announced on Dec. 23, 1969, that the Philadelphia Mint and GM had “mutually agreed” to cancel the project. “The short die tool life and other mechanical problems make the coin roller uneconomical in comparison with the four-strike press which the Mint developed during the coin shortage and during the development of the coin roller,” he stated. “Lengthy tests have shown that the effective life of dies used on the roller [press] is much shorter than dies used in conventional stamping processes.”

Why was the life of a die so short on the roller press, and what was the problem with the steel being used? In retrospect, it can be seen that a die subjected to constant rotary action, and torque, receives significantly more stress than a die that is used to stamp a coin planchet head-on. There was probably nothing “wrong” with the quality of steel used to make the dies — it boiled down to how the dies were physically used in a mechanical operation.

Some articles and entries in numismatic reference books suggest that GM created the Lincoln head dies and that the government forced GM to stop using them, but these allegations have no merit. The reason is that the Philadelphia

Mint supplied all of the dies used in the roller press project, and shipped them to the Tech Center for testing purposes. “We certainly were authorized to use those dies,” a former Tech Center employee recalled. “The implication [in the articles and reference book entries] that GM made those dies or did something illegal in striking those pieces is absolutely false. But this is what happens when outsiders who don’t know the true facts try and imagine what really happened.”

“As far as I know, all the dies we used came from the Mint,” another former Tech Center employee stated. “We never made any Lincoln head dies at the Tech Center, at least while I was there. The Mint also made the first dies we used to strike the GM tokens [Variety 1].” Another former Tech Center employee said: “Why not ask Frank Gasparro? He engraved the dies for the Lady Head piece; he might know who engraved the others.”

I lent attentive ears to that comment. How did he know Gasparro engraved the Lady Head dies? “Mint officials told us,” he replied. If nothing else was news, it seemed to me that if Frank Gasparro had engraved the Lady Head dies, that alone would be important numismatic history to put on record. (Interestingly, both the obverse and reverse sides bear the single letter G, a feature not seen on the so-called “Libertas Americana” piece discussed later in this article.)

On Jan. 17, 1995, in a telephone interview from his home near Philadelphia, former U.S. Mint Chief Sculptor-Engraver Frank Gasparro answered my question: “Yes. I engraved the dies for the Lady Head piece. All those GM pieces were what we call nonsense coins, and they were made only for testing purposes. I did engrave all the dies. They were designed to strike experimental or trial coins, because it is illegal to strike official U.S. coins outside of the Mint.”

“The Lincoln head dies, too?” I asked.

“Yes,” he answered. “I also prepared the Lincoln head dies. All those for the GM project, I made.”

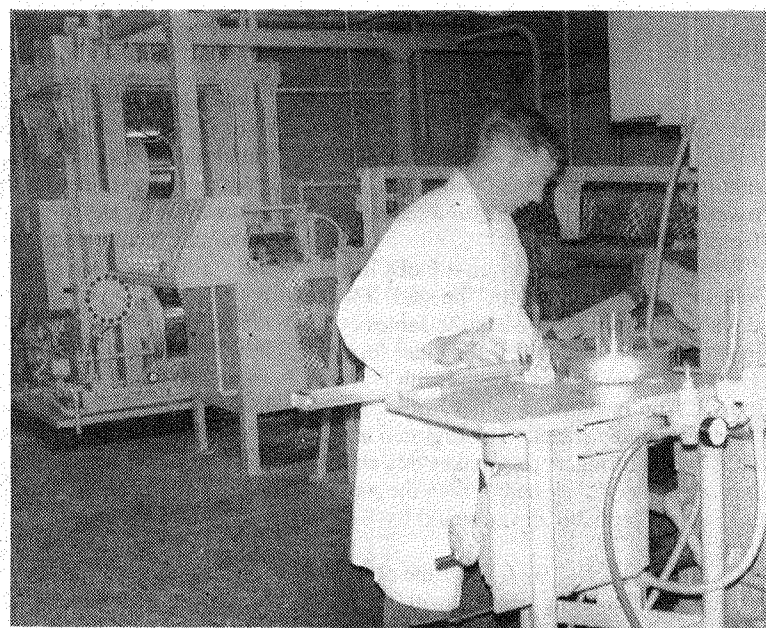
I pressed him for details because I was curious about the sandblast feature, which was first documented in 1964 by a Tech Center shop foreman, and what he thought about the uniform rims — an unusual feature of these issues. But Gasparro declined: “I’m retired,” he said. “I’m not an official Mint

employee anymore, and I can’t represent the Mint in talking about the GM pieces. If you want to learn more, you need to contact the Mint.”

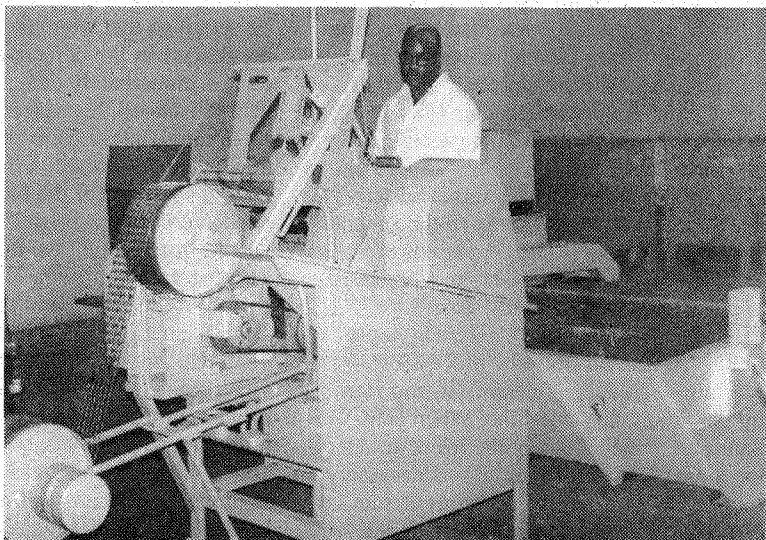
California dealer Jesse Patrick recently publicized in *Coin World* and *Numismatic News* an experimental “one cent” issue which he identifies as a product of the GM roller press, but I believe the attribution to GM is incorrect. The reason is that the “Libertas Americana” issue, as Patrick has described it, “appears to be struck from a steel alloy, as it is highly magnetic and steel in color.” The piece is further described as measuring about 0.748-inch in diameter and weighing about 2.8 grams. The reverse bears some — but not all — of the same inscriptions which appear on the Lady Head piece, and denticles around the inside rim which do not. The obverse design’s similarity to Augustin Dupre’s *Libertas Americana* medal, struck in the late 1700s (but without Liberty cap and pole), has no obvious connection to the GM pieces.

If the *Libertas Americana* issue is made of steel, that fact would virtually preclude it from having been struck on the roller press at the Tech Center. Putting steel through the roller press would have broken all of the dies “immediately,” several former Tech Center employees stated emphatically. “It requires tremendous pressure to strike coins out of steel,” one stated, “like 10 times as much as copper. The roller press wasn’t designed for steel, wouldn’t have worked with steel, and it would have been unthinkable for anybody to have fed steel through it. There wasn’t enough pressure to strike coins like that in steel.”

A more likely explanation is that the *Libertas Americana* issue was struck at the Philadelphia Mint, as part of its experimentation with other metals to strike cents. “A steel piece couldn’t have been



**ROLLER PRESS** was demonstrated at the 1969 opening ceremony of the new Philadelphia Mint. Technician is shown inspecting press.



**PLANCHET STRIP** leaves one of two punching and striking stations on GM roller press, shown in a demonstration operation at the new Philadelphia Mint in 1969.

struck at the Tech Center using the [roller press] machinery we had,” he said.

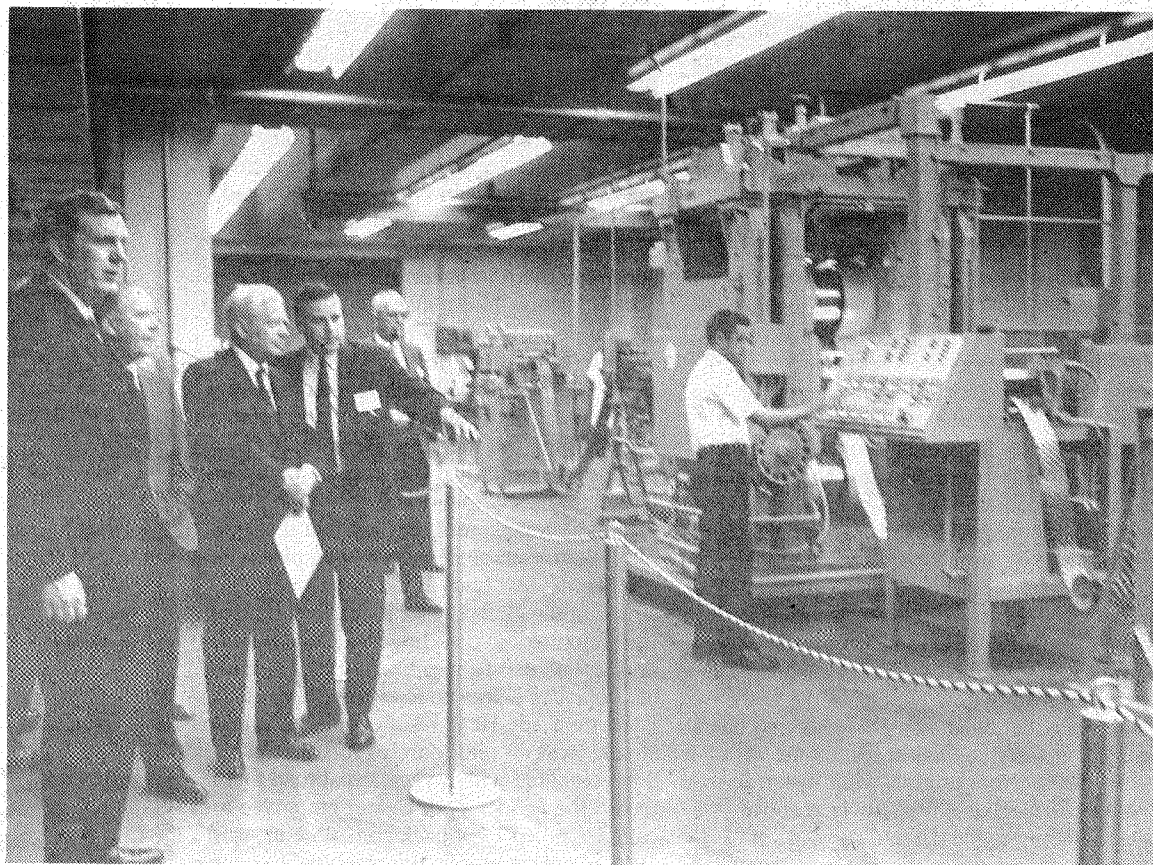
Since the reverse of the *Libertas Americana* piece bears a design used by the Mint for experimental or trial coins, it is reasonable to conclude the dies for this issue

were made by the government. But it seems very unlikely that the *Libertas Americana* issue was produced by the roller press at the Tech Center. In visually comparing the *Libertas Americana* issue with

Please see **GM** Page 75



**JESSE PATRICK** discovered this piece, which resembles the GM roller press piece series but which author Eric M. Larson believes is not a part. (Photo courtesy Jesse Patrick)



**TREASURY SECRETARY** Douglas Dillon, third from left, looks on at a demonstration of the GM roller press at the opening ceremony of the new Philadelphia Mint in 1969. GM and Mint officials later canceled the project because of excessive die wear and breakage.



GM from Page 72

the early roller press issues, it may be tempting for some people to conclude that the Libertas Americana issue was also a roller press issue. At this juncture, there is insufficient evidence for me to conclude that the Libertas Americana piece is an issue from the GM roller press.

Whether the Mint will again contract with a private company to test alternative materials for coins, build a new coinage machine, or undertake some other activity, is an unknown. It took the demands of a world war in the first instance, and a national coin shortage in the second. Each case involved the denomination of greatest mintage – the cent. Both instances also have in common the notion that government officials believed that involvement with private companies was an appropriate method for reaching a goal of national importance. It will be interesting to see if such collaborations occur in the future.

The GM roller press strikes are among the few issues made, as Pollock states in *United States Patterns and Related Issues*, "on behalf of the government using government dies, but outside of the Mint," and he classifies them among the rarest of seven pattern varieties he has identified. Pollock has documented just one other example: experimental "cents" minted in 1942, during World War II, by private firms seeking to assist the government in testing alternatives to copper. Struck in glass, various metal alloys, plastic, and other non-traditional compositions using dies supplied by the Mint, these tokens (or experimental coins) bear a Liberty motif and altered legends adapted from the obverse of a circulating Columbian 2-centavo coin of that era, and "a reverse design selected from a Washington medalet designed by Anthony C. Pacquet in 1861, again with altered legends."

To my best knowledge, these are the only two documented instances in the history of

U.S. coinage that the Mint has provided dies to a private company for striking experimental issues outside of the Mint.

The GM roller press issues have an interesting history, and assembling a complete set is probably impossible. The Lady Head pieces apparently are the best known and the most numerous, but obtaining one example from each die that was used likely cannot be done. While they could seem of less numismatic interest than other issues from the two GM roller presses, the GM/MD pieces arguably are unique as the first issues; they are no less a part of this story, and certainly are extremely rare. GM Lincoln head issues may be classified as tokens, and as a variety of pattern, trial, experimental, or prototype "one cent" coins. They also apparently are the only issues with the motif of an official circulating U.S. coin ever struck on behalf of the government outside a Mint facility, using dies supplied by the government.

Surviving examples of the General Motors Lincoln head issues are, consequently, perhaps the ultimate rarity within this rarest of all pattern varieties. **CW**

## AMSA plans activities

An educational lecture, artist workshop and display are all planned as part of the events accompanying an exhibit of medallic art to be shown between Dec. 14 and Feb. 24, 1996, at the Newark Museum in Newark, N.J., sponsored by the American Medallic Sculpture Association.

Dr. Alan M. Stahl will deliver a lecture on the history of the medal prior to the Jan. 21, 1996, official opening reception.

On Feb. 10-11, AMSA members will demonstrate their work.

The Newark Museum will sponsor a three-day workshop on die engraving by sculptor/engraver Virginia Janssen. The workshop is offered at \$225 including all tools and materials needed.

Show chairman John Molloy III can be contacted at (203) 767-1851. **CW**

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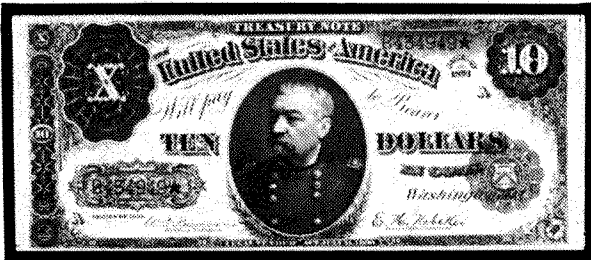
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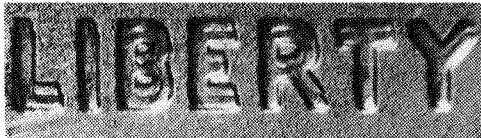
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