Types of die varieties

Many series of US coins are collected by die varieties. As shown in the Red Book, scarce varieties may be worth many multiple of their common variety counterparts. For one who wishes to engage is such, a basic review of the method of die preparation is needed.

Listed in the Red Book are many types of die varieties, from earliest issues to modern times. The types of those varieties vary with the method of die manufacture, as each process has its own potentials for errors to occur.

In the early years of coinage, individual features were punched into each working die. As such, die varieties such as added or deleted poles, stems, etc were produced, as well as occ. mis-spelled words, incorrect number of stars (1828 12 stars ½ cent), punched-over digits in the denomination, etc.

Beginning in the mid 1830's, a design-reduction process was used to create a hub, from which a master die was then made. As features such as letters, stars, etc were on the model from which the hub was made, production of these types of varieties ended, but the possibility for doubled dies was introduced. Indeed, the earliest known doubled dies are from the mid 1830s. As more than one impression was required at each step, to fully transfer the design, the possibility exists for there to be master doubled dies. In fact, these are known to exist.

A result of using the design-reduction process is that fine details in the model (~ 12" in diameter) could be transferred to the much-smaller hub. This becomes important in counterfeit detection, as a similar process is used to make counterfeit dies, but a genuine coin is used as the model, & some detail is lost in the transfer process.

Please refer to the handout: the purpose of having several steps between the initial hub & working dies was to prolong the life of the hub. Until 1909, the date was punched into each working die, allowing for re-punched dates & mintmarks. Over dates & over mintmarks also were produced by this method, presumably for the purpose of continued use of an otherwise acceptable die. The last over date produced by this method is the 1909/8 double eagle.

After 1909, the date was punched into the working hub or the master die, eliminating re-punched date varieties. The overdates which occurred after this date are actually doubled dies, where a master from the earlier used started the process of working die manufacture, but the process was completed using a hub from the later year.

All dies were made in Philadelphia prior to 1996. Those dies for use at branch mints were punched with the appropriate mintmark & shipped. As a result, there are over-mintmarks known for in several series, such as 1882 O/S & O/CC dollars, 1950 D/S & S/D quarters, 1955 D/S nickels, etc. After 1990, the mintmark was added to the master die, ending the possibility of this type of variety.

Early American coins were struck w/o a retaining collar, which caused a limited die life of only a few thousand strikes per die pair. Later, as metallurgical technology improved, & a retaining collar was used, die life was extended. The longest die life I have seen is on Peace Dollars, in which a die pair struck up to 500,000 coins. Modern dies last ~100-200,000 strikes, as the copper nickel clad is harder than silver or gold.

The useful die life for proofs is much less, from a few hundred strikes for the early years to ~3000 now. In the past, after a die pair was no longer suitable for striking proofs, that die pair was used to make business strike coins. When there are die markers identifying those dies, the coins from those dies are quite collectable.

Prior to ~1921, the dies were often given a final polish, called "basining", prior to being placed into service. As a result, the early strikes from those die had a proof like appearance. As the dies were used, microscopic friction lines developed on the dies, & the proof like feature changed into a satiny appearance. As a result, proof like coins often bring a significant premium over their non-PL counterparts. In some early proof sets, DMPL business strike coins were occasionally used instead of actual proofs, & these can be cherry picked by a knowledgeable collector. Proof likes after this date are known, but are from trying to polish out clash marks rather than preparing the die for service.

Types of die varieties

Types of doubled dies – refer to handout.

Other die varieties include over polished dies such as the 1937D 3 leg Buffalo nickel, die gouges such as the 1804 "spiked chin" half cent, clashed dies such as the 1955 Franklin half "Bugs Bunny", re-engraved dies such as many of the 8TF Morgan VAMs, die breaks & cuds, & other minor varieties.

Sometimes when examining a coin, it may not clear whether an unusual feature is due to a planchet defect or is a die variety. If a duplicate can be found, it is certain that the feature was in the die from which the coins were struck.

Die markers such as die doubling, die scratches or gouges, polishing lines, etc can be used to confirm (or refute) a coins authenticity, and may be collectable in their own right, such as VAM varieties of silver dollars or Overton varieties of bust halves. Bill Fivaz has written an excellent book on counterfeit detection, showing die markers & mintmark placement on the genuine coins covered in his book. In an era of ever increasing Chinese counterfeits, knowing these is ever more important.

Quiz on Die Varieties

1. The die for the 1918/7 – D Buffalo nickel was make to preserve an otherwise useful die, by manually punching an 8 over the 7 in the date. – False
2. The 1938 D/S Buffalo nickel is an example of a doubled die. – False
3. Learning the different mintmark placements will help I detection of counterfeit 1928 Peace dollars. – False
4. Proof like 1926-S Peace dollars are known, although rare. These were created by the dies being basined prior to being put into use. – False
5. Proof like 1926 –S Morgan dollars are common, and bring no premium over coins with a satiny luster. -- False
6. Due to the care in making individual dies, and the fact that the metals used for coins were softer than the current copper-nickel, dies made series such as Draped Bust tended to last longer than modern dies do. – False
7. Collecting coins by die variety and trying to cherry pick them is a useless exercise in futility, as there is little difference in price between the “normal” and” variety” coins. – False
8. The 1995 D/D half dollar with re-punched mintmark is a popular variety among Kennedy half collectors. – False
9. The 1974 –D Kennedy half doubled die obverse was the result of poor quality control at the Denver mint. – False
10. If you are examining a coin with an usual feature, you can be certain that it is a die variety, as opposed to a planchet defect, if you can find a duplicate. – True

Tie breaker questions:

1. All over dates after 1910 are which class double dies? – III
2. From the handout, the master hub is a + or – image? +
3. Which will tend to be the scarcest type of die variety? – die break

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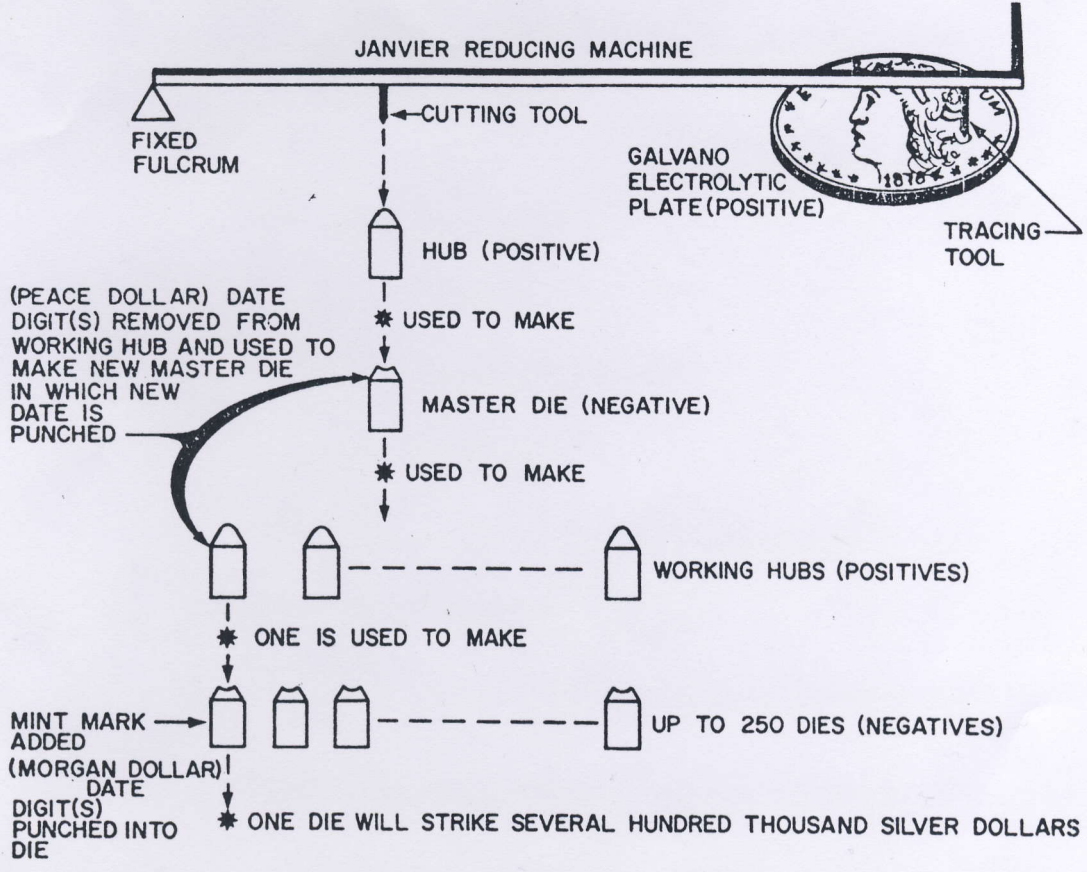
JANVIER REDUCING MACHINE
FIXED FULCRUM
CUTTING TOOL
GALVANO ELECTROLYTIC PLATE (POSITIVE)
TRACING TOOL
HUB (POSITIVE)
(PEACE DOLLAR) DATE DIGIT(S) REMOVED FROM WORKING HUB AND USED TO MAKE NEW MASTER DIE IN WHICH NEW DATE IS PUNCHED
USED TO MAKE
MASTER DIE (NEGATIVE)
USED TO MAKE
WORKING HUBS (POSITIVES)
ONE IS USED TO MAKE
MINT MARK ADDED (MORGAN DOLLAR)
DATE DIGIT(S) PUNCHED INTO DIE
UP TO 250 DIES (NEGATIVES)
ONE DIE WILL STRIKE SEVERAL HUNDRED THOUSAND SILVER DOLLARS

Basic Die Production Theory

Current Mint Procedures

As of 1990 the mint begin producing a master hub (reduction from the galvano) each year, with the full date of that year. They then make several master dies into which they punch the mintmarks, generating one master die for each mint. For some series, such as commemoratives and bullion coins, the mintmarks are on the galvano. In contrast, prior to 1990 mintmarks were placed on individual working dies. Several working hubs are produced from each master die and hundreds of working dies can be produced from each working hub.

Prior Mint Procedures

Prior to 1990 the mint would occasionally produce a master hub (reduction from the galvano) with a partial date, either a two digit or three digit date depending upon need. There are several reasons for this, one being that it takes several days to produce a master hub. From the master hub a master die is drawn and the remaining portion of the date punched into the die by hand. This master die was then used to make working hubs and they in turn were used to make working dies. It has been theorized that the mint would on rare occasions take a full date hub, either working or master, and grind off the last digit. This modified hub would then be used to make a master die and the fourth digit punched in by hand. Should the last digit not be completely ground off, traces of it would be visible under the punched digit. Some have suggested that the 1958 Lincoln cent shows a 7 under the 8. Although currently not accepted as a doubled die by most researchers, such an overdate could have been produced by this method and would be classified as modified hub doubled die.

Obverse Series Doubling Procedures

Series doubling on the obverse could also occur by this method. If the hub which is used to produce the two or three digit master die, by grinding off the last one or two digits, is itself doubled (i.e. producing working hub doubled dies) then all subsequent hubs, which would bear a different date, would also be doubled. Apparently this is what happened on the Jefferson nickel series which shows doubling on the UST of TRUST on every year from 1939 to 1956 and 1959 to 1964. The 1939 master die was doubled; a class V doubled master die. It was then used to create a hub from which the last two digits (39) were removed. That modified hub was then used to make a master die in which the last two digits (40) were punched. It was used in all subsequent years by punching into the master die the appropriate last two digits.

Class of Doubling

55 D Dexample

Definitions for Classes I - VI are taken, with minor editing, from *What Are Doubled Dies?*, J.T. Stanton, ed. The definition of Class VII is taken from *The Lincoln Cent Doubled Die* by John A. Wexler. The first definition for Class VIII is taken from *The Official Price Guide: Minting Varieties and Errors*, 5th edition, by Alan Herbert. The second definition is taken from *Numismatic DATA Book* by Delma K. Romines, forthcoming.

Class I - Rotated Hub Doubling

This class occurs when the hub, after the initial impression into the die, is re-impressed into the die, and rotated slightly either clockwise or counter-clockwise around the center of the coin in relation to the initial impression. The images around the rim will be of equal spread, yet the spread at the rim will be greater than that toward the center of the coin. The most well known known examples are the 1955 Lincoln die #1 (counter-clockwise) and the 1972 Lincoln, die #1 (clockwise).

Class II - Distorted Hub Doubling

With this class, we must point out that there may be some time between the first hubbing and any subsequent hubbings. During this time, the hub is normally used to make either initial or subsequent hubbings into other dies, and after a number of uses, the hubs have a tendency to flatten out very slightly from use. (Imagine the end of a Tootse Roll pressed into the top of a table). If for some reason that hub was used for an above average number of hubbings prior to the die being brought back for the subsequent hubbings (or the hub has "spread" prematurely due to improper hardening during its production), and then used for another impression into the die, it will result in the second image that is spread toward the rim. The use of an entirely different older hub may also achieve the same results. The opposite can also happen, as the worn hub could be used for the initial impression and a newer hub used for subsequent impressions, resulting in doubling which is spread toward the center of the die.

Class III - Design Hub Doubling

This class is caused when one hub is used for the initial impression into the die, and after a design change, a hub with a slightly different design is used for subsequent hubbings. Well known known examples of this form of doubled die would be the 1960-D Small date/Large date Lincoln Cent, the 1943/2-P Jefferson Nickel, the 1942/1-P Mercury dimes, and the 1878 7 over 8 tail feather Morgan Dollars. Keep in mind that not all Class III varieties are overdates, and not all overdates are doubled dies.

Class IV - Offset Hub Doubling

This form of doubling is caused when one impression of the hub into the die is offset (misaligned laterally) in one direction from the other impression(s). The best example of this form of doubled die is the recent 1983-P Lincoln Cent with the doubled die reverse, with the second impression spread toward the north.

Class V - Pivoted Hub Doubling

Pivoted Hub doubled dies are somewhat more complex in understanding the exact causes of a "pivoting action," but as the name implies, they are the result of a die or hub being pivoted in relation to the other during the hubbing process. The Pivot usually occurs at or near the rim and results in a fan shaped spread that progressively increases in degree as you move further away from the pivot point. A number of different causes can be identified, with one of the most common being a buildup of foreign material stuck in one or more of the alignment slots that are placed around the circumference of a hub. These slots insure proper alignment of the die and hub during subsequent hubbings. A very nice example of a pivoted hub doubled die is the 1917 Lincoln Cent, with the strongest doubling on the date, and decreasing on the motto, and very little doubling showing on LIBERTY.

Class VI - Distended Hub Doubling

This form of doubled die doubling is the most difficult for many novices to identify as it will rarely show any separation of the two images. Sometimes the raised images on the hub become flattened and thicker than normal. When one normal hub is impressed into the die, then is followed by a flattened hub, the resulting image will be much thicker than normal. There are probably no fairly well known examples to non-variety specialists.

Class VII - Modified Hub Doubling

This particular class gets its name because the doubling comes from a hub which has been modified in some manner. The modification of the hub is usually in the form of grinding off some part of the undesirable design element. Rather than waste a perfectly good hub which can be used to make impressions in thousands of dies, the unwanted part of the design is ground off and then the hub can be used to make the initial impression(s) in the dies. A complete hub with the full acceptable design is then used to make the final hubbings of the dies. The problem

The sources used were "Comprehensive Catalogue and Encyclopedia of Morgan and Peace Dollars" by Leroy Van Allen & George Mallis (the VAM book), from which the information on die preparation was derived, "The CONECA U.S. Doubled Die Master Listing" compiled by John A Wexler, Delma K. Romaines, & J. T. Stanton from which the page on types of die doubling was obtained.