

## **Some Thoughts on Provincial Cent Mintages & Die Longevity**

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With my published work on 1858 and 1859 over-dated cents, along with Dr. Haxby's recently published research on 1859 narrow "9" cents, many facts about this interesting bronze coinage have become clearer. In this article I will focus on two areas. First, we can now conclusively determine that the traditionally published mintage figures<sup>1</sup> are greatly in error. Second, we finally have enough information to examine in some detail the longevities of the working dies and how they determine the relative rarities of die varieties.

### **The Mintages**

The traditionally reported mintage figures for 1858 and 1859 cents derived from the 1891<sup>2</sup> and 1911<sup>3</sup> annual mint reports. The 1891 report stated the Royal Mint coined 10,000,000 Provincial cents. The 1911 report contained a footnote to a table saying 421,000 cents were struck in 1858. Simple subtraction led to a conclusion that 9,579,000 were minted in 1859. Even if these numbers were correct, which at least one was not, these traditional mintage numbers presumed that cents struck in 1858 were all dated 1858 and those struck in 1859 were all dated 1859. This almost certainly was not the case.

In 2007, I published that the Royal Mint delivered a total of 9,690,388<sup>4</sup>, not 10,000,000, bronze cents to the Province of Canada. I based this conclusion on several contemporary records and consider it to be both precise and correct. I refer the reader to my book for a full discussion of the actual mintages for the four Provincial coinage denominations.

In that same book, I published that about 1,540,000 of the 9,690,388 cents bore the 1858 date. I arrived at this number by prorating the number of known 1858 dies to the total number of dies sunk, after making some assumptions regarding obverse to reverse die ratios and the number of dies that may have been recorded, but destroyed without minting any coins. In 1859, the Royal Mint shipped 1,540,000 cents to Canada. Since this number fell nearly in the middle of my die proration estimates, I felt that this first shipment probably contained the entire 1858 dated mintage and little else. In April 2008, I further estimated<sup>5</sup> the 1859 over-dated cent mintage lay between 385,000 and 880,000 coins, depending upon whether one used an obverse, or a reverse, die proration.

Also in 2008, Dr. Haxby, by prorating the reverse dies under different assumptions (primarily that all dies shown as destroyed in 1858 and 1859 actually minted coins), published estimated mintages of 1,414,850 for 1858 cents, 320,343 for 1859 over-dated cents; and by subtraction 7,955,195 for 1859 narrow "9" cents<sup>6</sup>.

Several new 1858 and 1859 over-dated dies have been discovered since these previous estimates. In addition, Dr. Haxby has now published quite a bit of his 1859 narrow "9" die research. It is now time to revisit and adjust these mintage figures.

The die records for the Provincial cents still exist<sup>7</sup>. They show the Royal Mint sank a total of 168 obverse and 402 reverse dies for Provincial cents. During the years 1858 and 1859 the records reflect the Royal Mint destroyed 137 obverse and 360 reverse dies, presumably after using them to mint Provincial cents. They later destroyed 4 obverse and 3 reverse dies in 1863, leaving 27 obverse and 39 reverse dies remaining after that date. Finally, they destroyed 27 more reverse dies in 1864, lowering the then surviving total to 27 obverse and 12 reverse dies.

My work has turned up 22 obverse dies that minted circulating 1858 cents and 13 obverse dies married to circulating 1859 over-dated cents. Dr. Haxby has catalogued<sup>8</sup> 105 obverse dies used to mint circulating 1859 narrow “9” cents.

Five known obverse dies struck more than one type of Provincial cent. Two struck both 1858 and 1859 over-dated cents. Three dies coined both 1859 over-dated cents and 1859 narrow “9” cents. If we prorate these five obverse dies by the number of reverse dies mated with them, we can fractionally apportion each into the correct category. For example, Turner Die OD4 was married to Die RB2 (an 1858 reverse die) and Die RD10 (an 1859 over-dated reverse die). We apportion 50% of Die OD4 to the 1858 mintage and 50% to the over-dated mintage. When we apportion all five of these obverse dies in this manner, we arrive at 20.90 dies, 10.47 dies, and 105.63 dies used to mint 1858, 1859 over-dated, and 1859 narrow “9” cents, respectively. Prorating the total Provincial cent mintage of 9,690,388 coins by these obverse die totals yields the estimated mintage numbers shown in Figure 1.

### Provincial Cent Mintage Estimates Computed By Die Prorations

Date	Obverse Die Proration		Reverse Die Proration		Obv./Rev. Die Ratio
	Number of Obv. Dies	Estimated Mintage	Number of Rev. Dies	Estimated Mintage	
1858	20.90	1,478,315	54.00	1,453,558	38.70%
W9/8	10.47	740,572	13.00	349,931	80.54%
Narrow 9	105.63	7,471,501	293.00	7,886,899	36.05%
<b>Totals</b>	<b>137.00</b>	<b>9,690,388</b>	<b>360.00</b>	<b>9,690,388</b>	

Figure 1

These obverse die numbers suggest two other conclusions. First, we have yet to discover two obverse dies. Assuming any obverse dies used solely to mint specimen quality cents resided in the 27 obverse dies surviving in 1864, then 22 dies + 13 dies + 105 dies – 5 overlapping dies = 135 dies, verses the 137 dies expected from the die records. Second, it appears probable that all obverse dies destroyed in 1858 and 1859 actually minted coins, which simplifies matters by eliminating one unknown quantity.

Unfortunately the die records do not reflect the distribution of the reverse dies by date (1858, over-dated, and 1859). If we undertake a similar proration exercise for the reverse dies, we get the reverse die results presented in Figure 1. Since Dr. Haxby has catalogued 204 reverse dies, it implies that 89 more reverse dies await discovery. These unknown dies could be 1858, 1859 over-dated, or 1859 narrow “9” dies.

Although difficult to prove conclusively, I have always felt an obverse die proration will ultimately be more accurate than a reverse die proration. Two facts lead me to conclude that obverse dies were all used to failure, while the reverse dies were not.

- Finding 135 of the possible 137 obverse dies provides confidence that probably all 137 dies were fully used to mint circulating cents and none were destroyed prior to entering the coin presses.
- The last three die batches (twelve dies each) sunk on June 24, July 13, and October 13, 1859 consisted of only obverse dies. The Royal Mint sank the last batch of reverse dies on June 13, 1859. Meanwhile, coinage of the cents continued into December 1859. This implies that reverse dies were not in short supply at the end of the job. This might also mean some reverse dies were destroyed without minting any coins, or were lightly used, both of which would distort any reverse die proration.

Figure 1 shows the obverse to reverse die ratios for each of the three types of cents. The 1858 and 1859 narrow “9” ratios are nearly identical. The ratio for the over-dated cents was much higher. In my second book, I concluded this indicates the mint somehow changed their practices for these over-dated coins. It is difficult to say whether this affected obverse or reverse die usage more greatly. The best we can say for over-dated cents may be that the true mintage probably lies between the two figures shown in Figure 1, and any complimentary variation affects the 1859 narrow “9” mintage more than the 1858 mintage.

I doubt we will ever know the exact numbers of 1858, 1859 over-dated, and 1859 narrow “9” cents minted. Detailed mint records on the subject have not been found and probably never existed. The mint staff simply didn’t care what dates these coins displayed. Only we collectors and numismatists do. I believe the obverse die proration numbers shown in Figure 1 are as close as we will ever come to the correct mintage figures.

## **Die Longevity**

Now that we have reasonably accurate estimates for the 1858 and 1859 over-dated mintages, we can look more closely at Provincial cent die longevity. I based my 1858 cent research on a random sample of 150 coins. The over-dated cent research relied on a similar random sample of 100 coins. Because these samples were random, I used them to estimate the percentage of each mintage coined by each die. Using the mintage numbers calculated in Figure 1, we can then easily compute the estimated numbers of coins struck by each die.

Figure 2 contains two charts, the top one for the 30 obverse dies and the bottom one for the 66 reverse dies used to coin 1858 and 1859 over-dated cents. I chose to omit the three obverse dies (Turner Dies OG3, OG4, and OI1) that also minted 1859 narrow “9” cents, because I do not know the percentages of the narrow “9” mintage coined by each. The blue lines in each chart show the actual distributions of mintages per die in brackets of 20,000 coins. The charts bring to light several interesting facts:

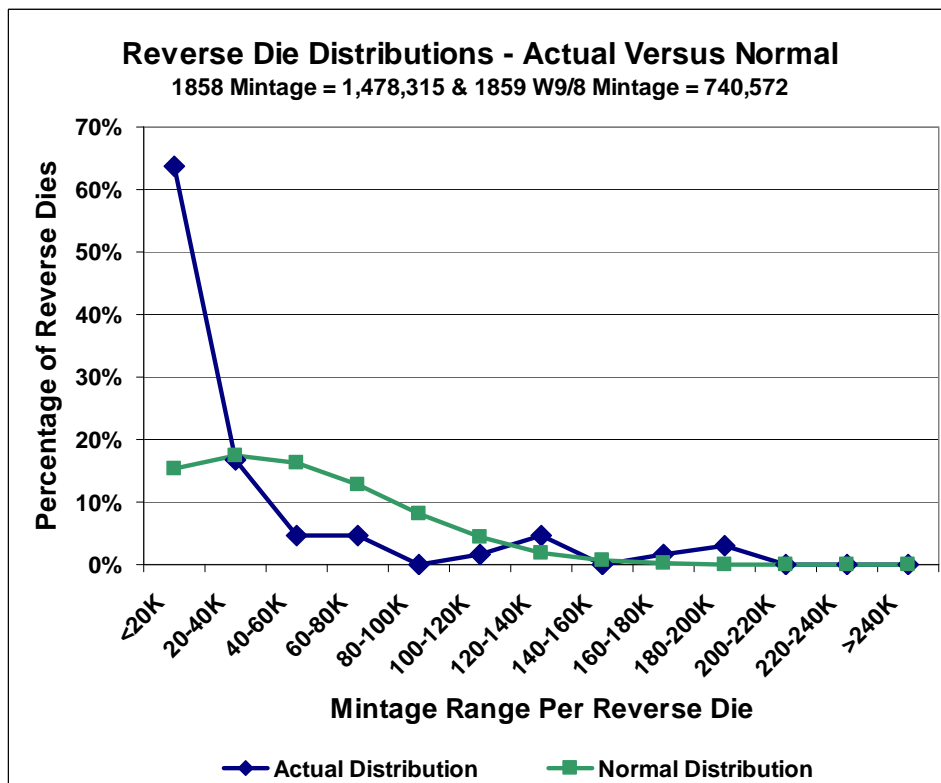
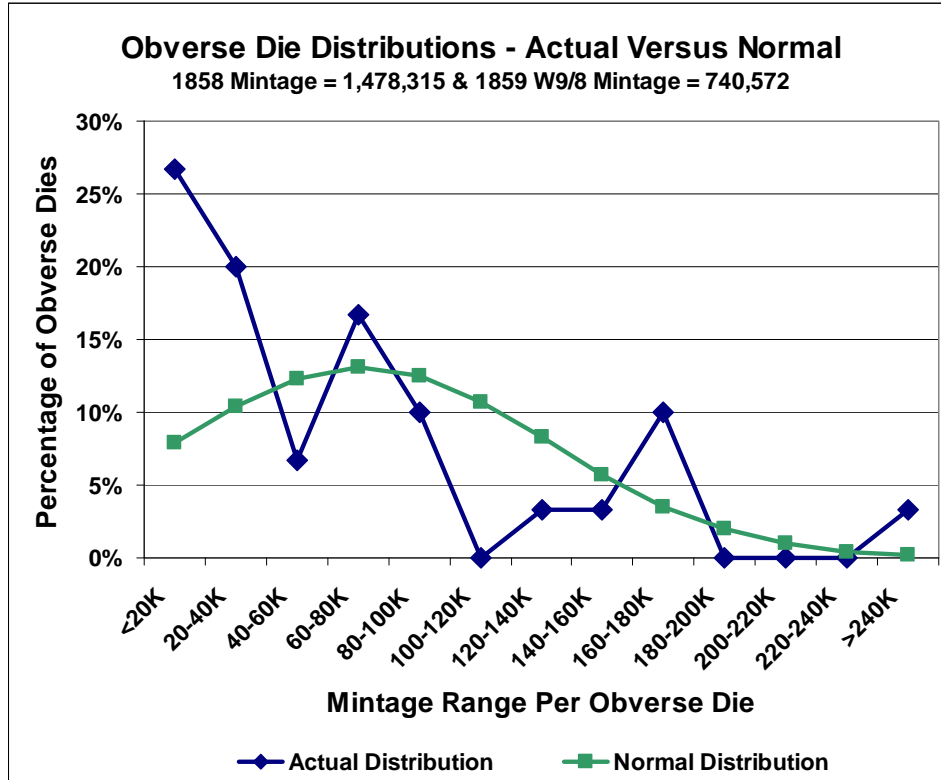


Figure 2

- The mean mintage of each obverse die was 71,494 coins, but one standard deviation was equal to 60,916 coins. Although interesting, the mean provides little help in understanding die longevity, because the longevity varied so widely.
- The estimated mintages of the thirty obverse dies varied from 7,406 coins (Die OG2) to 246,386 coins (Die OF1).
- The mean mintage of each reverse die was 33,619 coins, but one standard deviation was equal to 45,872 coins. As with obverse dies, reverse die longevity varied a lot.
- The estimated mintages of the sixty-six reverse dies varied from some very low number (Die RD13 was so scarce it didn't appear in the random sample of 100 coins), or more discretely 7,406 coins (Dies RD11 and RD12), up to 185,143 (Die RD1) and 187,253 coins (Die RB1).

The green lines on each chart denote a normal distribution having the same mean and standard deviation as each actual die distribution. A normal distribution has the familiar bell shape and represents the expected probability distribution of a large number of random variables.

The obverse die chart of Figure 1 was based on 30 dies. Thirty barely meets the minimum threshold for a “large number of random variables” needed for a normal distribution to be applicable. Having said that, if we knew the random probability distribution of the 105 narrow “9” dies in the same detail as for the charted 30 dies, in my opinion the total obverse die distribution would move reasonably close to the normal curve. I say this because the two obverse curves of Figure 1 are already not terribly different and I would expect the larger number of more fully used-to-failure obverse dies to approach a random distribution.

Conversely, the reverse die curves of Figure 1 were based on the larger number of 66 dies. The actual and the normal curves are more diverse than for the obverse dies. The actual curve is skewed heavily towards very low mintage dies. In my opinion, this indicates a lack of randomness and lends credence to the supposition that some reverse dies were not used to failure.

Collectors have once again begun to discover and collect Provincial cent die varieties. Since most of these die varieties relate to a single die, such wide swings in die longevity have a large impact upon their relative rarities. The next time somebody tries to sell you a double punched whatever, recognize that the mintage of that variety could easily be anywhere in the approximate range of 8,000 to more than 200,000 coins. In my books, I have published the relative rarities of each die for the 1858 and 1859 over-dated cents. Those of the 1859 narrow “9” die varieties should become clearer over time, as more and more variety collectors seek them out.

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<sup>1</sup> *The Decimal Coinage of Canada & Newfoundland*; by F. Bowman; *The Numismatist*, Volume LX; March 1947.

<sup>2</sup> *Twenty-Second Annual Report of the Deputy Master of the Mint, 1891*; Appendix No. XVI; pp 104-109; Her Majesty's Stationary Office; London 1892.

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<sup>3</sup> *Forty-Second Annual Report of the Deputy Master of the Mint, 1911*; Appendix G; page 170; His Majesty's Stationary Office; London 1912.

<sup>4</sup> *The 1858 Cents of Provincial Canada*; by Rob Turner; published by the author; Fountain Valley; April 2007.

<sup>5</sup> *The 1858 Cents of Provincial Canada, Volume II*; by Rob Turner; published by the author; Fountain Valley; March 2008.

<sup>6</sup> *Die Varieties of the Canadian Decimal Coinage of Queen Victoria, VI. Canadian Victorian Overdates and the Use of Unaltered "Stale-Dated" Dies*; by Dr. James A. Haxby; *Numismatica Canada*, Vol. 7, No. 4; December 2008.

<sup>7</sup> The National Archives; Mint 14/15; pages 279, 286, and 287.

<sup>8</sup> [www.vickycents.com/haxby-numbers.html](http://www.vickycents.com/haxby-numbers.html); downloaded January 7, 2012.