A Die Study of Victorian Shillings Dated 1865.
Part 2 – The Die Numbers

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Introduction

Following the previous BNS Blog note where the die numbered shillings of 1865 were used to validate the statistical methods used to predict the numbers of dies used for a coinage, images of 78 different shillings had been gathered each showing a different reverse die number.[1] A short addition to the project is presented here where an attempt is made to illustrate all of the known die numbers for 1865 shillings.

Contact was made with several collectors: David Morley (DM), Ron Stafford (RS), David Price (DP), Malcolm Wootton (MW) and Steve Bentley (SB), who all kindly provided both information and images that will be presented below. Steve Halliwell of the Shilling Appreciation Society Facebook group also provided an image of the elusive die number 50.

The Die Numbers

The following table summarises the known die numbers for the shillings of 1865.

	1	2	3	4	5	6	7	8	9
10	11	~~12~~	~~13~~	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	~~74~~	75	76	77	78	79
80	81	~~82~~	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99
100	101	102	~~103~~	104	105	106	107	108	109
110	111	112	113	114	115	116	117	118	119
120	121	122	~~123~~	124	125	~~126~~	~~127~~	~~128~~	~~129~~
130									

Table 1. Known die numbers on shillings dated 1865. Black – normal occurrence, red extremely rare, Shaded blue – have illustration, Red with strikethrough – not yet seen, but see notes below.

Die numbers 12, 13, 74 and 82 have not yet been seen, but probably exist. There is a suspicion that 126, 127, 128 and 129 might not have been used. Die numbers 103 and 123 are problematic in that the last digit of the die number is similar to a 5. In both cases no specimens convincingly different from a 105 and a 125 have been found. The alignment of the die number digits relative to the ribbon on the wreath and the digits of the date can be used to identify die differences. Numbers 103 and 123 will be left blank until convincing examples are found.

The last digit of the date on dies 3, 4 and 5 is from a different punch than those before and after, with a small dent in the top of the cross bar and a turned-up end.

Similarly die 29 has an unusual last date digit and certainly different from those before and after. This has been described as a 5 over 3, but maybe just a die flaw. A really good image of a high-grade specimen is needed to be more certain.

For dies 79 onwards, the master punch has a small but progressing flaw in the left leg of the N in SHILLING. There is no trace of the flaw on dies 1-78. on die 79 there is a bulge and a tiny split; by die 83 the split has enlarged and the bulge can be seen as a piece of metal breaking away; this is further away still by die 90 where

it is wedged between the left leg and the diagonal; from die 91, the piece of leg has completely disappeared; a chunk of the leg is missing on all remaining 1865 dies (91 to 130) + all 1866 dies + 1867 dies 1-15 and 19-37 but not on the 2nd reverse dies of 16-18; thus the die flaw exists on 144 dies over three years (RS and DM).

Fig. 1. First appearance and development of die flaw in N of SHILLING for 1865.

Many of the reverse dies show evidence of die clashing, with a silhouette of Victoria appearing in the field within the wreath. Some die numbers are known with undamaged dies and also with clashed dies.

Obverse Dies

Very few obverse dies show signs of clashing. The reason for this isn't immediately obvious; possibly a different hardening process or just purely mechanical and the relative areas of impact when the dies clash when a blank hasn't been fed into the press.

Many of the obverse dies show die flaws, especially tiny fractures from the outer beaded edge to the letters and between the letters and these features can be used to identify different obverse dies. In this way, reverse die Number 10 is known with 4 different obverse dies.

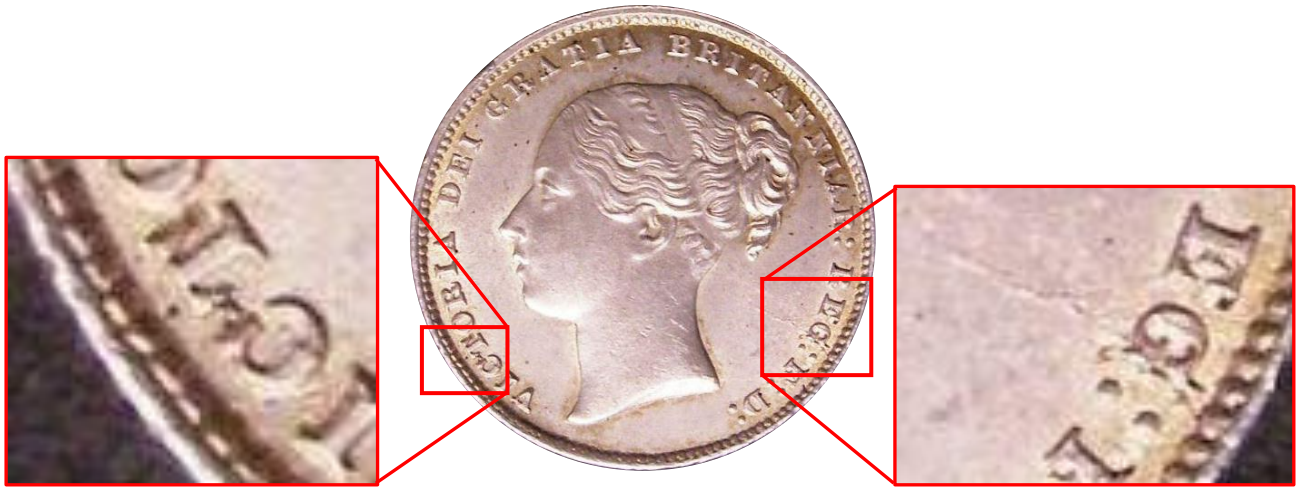


Fig. 2. Die Flaws on 1865[109].

Mint records are known that quantify the numbers of obverse and reverse dies made for the shillings each year for the period 1868-1882 and are tabulated below (See Royal Mint Reports[2]). Sadly no die data exists for 1864-1867. The shilling mintage figures are taken from Bull.[3]

Date	Obverse Dies	Reverse Dies	Mintage
1868	93	53	3,330,360
1869	22	16	736,560
1870	32	21	1,467,471
1871	94	59	4,910,010
1872	158	143	8,897,781
1873	214	142	6,489,598
1874	111	67	5,503,747
1875	120	67	4,353,983
1876	42	37	1,047,487
1877	81	54	2,980,703
1878	99	70	3,127,131
1879	157	140	3,611,507
1880	104	77	3,842,786
1881	120	90	5,255,322
1882	74	56	1,611,786
Totals	1521	1092	57,166,232

Table 2. Number of dies and mintage figures for shillings 1868-1882.

Thus, for this period, the average ratio of obverse to reverse dies is 1.4 and, again on average, each obverse die produced 37,600 coins and each reverse die 52,400 coins. These numbers are expected to apply to the years prior to 1868.

Whilst the stated numbers are precise, I suspect that as this is a high-speed industrial metal stamping operation the true mintage figures are unlikely to have errors less than 5%. The number of surviving pieces showing die flaws suggests that dies continued to be used until they failed, and the failure would be determined by spot checks of the coins in the hopper, or possibly periodic inspections of the dies, or maybe unusual noises coming from the press. Though in a workshop, the damage would have to be serious to be heard over the rest of the noise from the other presses.

The Images

The images used in the following pages have come from many sources ranging from auction archives and dealer's websites to eBay listings and searches of the www. They range from high resolution to just-good-enough images, to direct screen captures, to camera images of computer screens to photographs of foil impressions taken directly from coins!

Thus the images are very variable in quality and have been upgraded when possible. Many images have been taken at oblique angles and an attempt has been made to reduce the perspective and skew effects using PaintShop Pro. The results are sufficient to show the die numbers but may still be distorted.

The Catalogue

1865-1

1865-2

1865-3

1865-4

1865-5

1865-6

1865-7

1865-8

1865-9

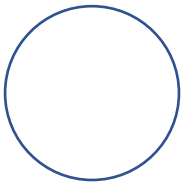
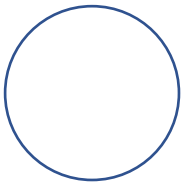
1865-10



1865-11

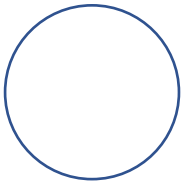
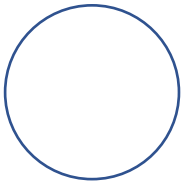


1865-12


Not known.

1865-13


Not known.

1865-14



1865-15



1865-16



1865-17



1865-18



1865-19



Foil Impression RS.

1865-20 

Foil Impression RS.

1865-21 

1865-22 

1865-23 

1865-24 

1865-25 

1865-26 

1865-27 

1865-28 

1865-29 

The 5 in the date looks to be from a different punch, possibly 5 over 3?

1865-30




1865-31



1865-32



1865-33



1865-34



1865-35



1865-36



1865-37



1865-38



1865-39



1865-40

1865-41

1865-42

1865-43

1865-44

1865-45

1865-46

1865-47

1865-48

1865-49

1865-50

1865-51

1865-52

1865-53

1865-54

1865-55

1865-56

1865-57

1865-58

1865-59

1865-60

1865-61

1865-62

1865-63

1865-64

1865-65

1865-66

1865-67

1865-68

1865-69

1865-70



1865-71



Foil Impression RS.

1865-72



Small die flaw below the horizontal bar of the 5 gives the impression of a 5 over 3.

1865-73

Reported, but no image.

1865-74

Not known.

1865-75



1865-76



On high grade specimens the 6 of the DN appears doubled.

1865-77



1865-78



1865-79



1865-80

1865-81

1865-82

Not known.

1865-83

1865-84

1865-85

1865-86

1865-87

High grade specimens show a doubled 8 in the DN.

1865-88

1865-89

1865-90

1865-91

1865-92

1865-93

1865-94

Later die state shows die filling on right hand loop of wreath ribbon.

1865-95

1865-96

1865-97

1865-98

1865-99

1865-100



Foil Impression RS.

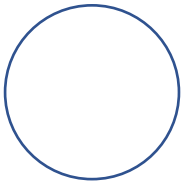
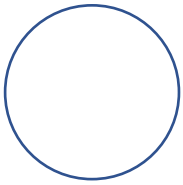
1865-101



1865-102



1865-103


Pieces described as 103 have turned out to be 105.

1865-104



1865-105



1865-106



1865-107



1865-108



1865-109



Extensive obverse die flaws.

1865-110

1865-111

1865-112

1865-113

1865-114

1865-115

1865-116

1865-117

1865-118

1865-119

1865-120



1865-121



1865-122



1865-123

All pieces described as 123 have turned out to be 125.

1865-124



1865-125



1865-126

Not known.

1865-127

Not known.

1865-128

Not known.

1865-129

Not known.

1865-130   

Sources of Images and Acknowledgements

The following are thanked for the use of their images:

[001]	eBay	[034]	Noonans	[067]	eBay	[100]	RS
[002]	Noonans	[035]	DP	[068]	eBay	[101]	eBay
[003]	eBay	[036]	eBay	[069]	DP	[102]	GO
[004]	DP	[037]	DP	[070]	Noonans		
[005]	eBay	[038]	eBay	[071]	RS	[104]	eBay
[006]	London Coins	[039]	Noonans	[072]	DP	[105]	DP
[007]	DP	[040]	DP			[106]	Noonans
[008]	eBay	[041]	eBay			[107]	Noonans
[009]	eBay	[042]	Noonans	[075]	DP	[108]	London Coins
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[032]	eBay	[065]	eBay	[098]	eBay		
[033]	KB Coins	[066]	Noonans	[099]	eBay		

Thanks are due to David Morley (DM), Ron Stafford (RS), David Price (DP), Malcolm Wootton (MW), Steve Halliwell (SH) and Steve Bentley (SB), who all kindly provided both information and images.

More Detailed Analysis

As we have an average output per die from Table 2 above, this data can be reasonably be extended to provide estimates for the number of dies used for the preceding years 1864-1868. The maximum known die number can also be added to the table.[(2)]

Date	Obverse Dies	Reverse Dies	Mintage	DN_{Max}
1864	120	86	4,518,360	80
1865	150	107	5,619,240	130
1866	133	95	4,989,600	70
1867	58	41	2,166,120	37
1868	93	53	3,330,360	51
1869	22	16	736,560	15
1870	32	21	1,467,471	20
1871	94	59	4,910,010	56
1872	158	143	8,897,781	155
1873	214	142	6,489,598	141
1874	111	67	5,503,747	70[(1)]
1875	120	67	4,353,983	74[(2)]
1876	42	37	1,047,487	36
1877	81	54	2,980,703	70
1878	99	70	3,127,131	76[(3)]
1879	157	140	3,611,507	26
1880	104	77	3,842,786	
1881	120	90	5,255,322	
1882	74	56	1,611,786	
Totals	1521	1092	57,166,232	

Table 3. Number of dies and mintage figures for shillings 1868-1882. Numbers in red are calculated assuming an average output per die. Numbers in blue are the currently known maximum, but see notes.

(1) Records of a 76 have propagated through the literature, but this number has not been verified and is likely a misreading of 70, numbers 71-75 are not known.

(2) The 84, 87 published by Bull[(3)] have not been verified, likely a misreading and too far away from the highest known of 74.

(3) The 84 given by Bull[(3)] is not verified, leaving the highest verified at 76.

That the obverse dies outnumber the reverse dies is very likely due to the high relief of Victoria's portrait and the obverse die having to do more work (move more metal) than the lower relief reverse dies. The plot below shows the numbers of shillings struck per obverse and reverse die for the period where reliable data exists i.e., 1868-1882.

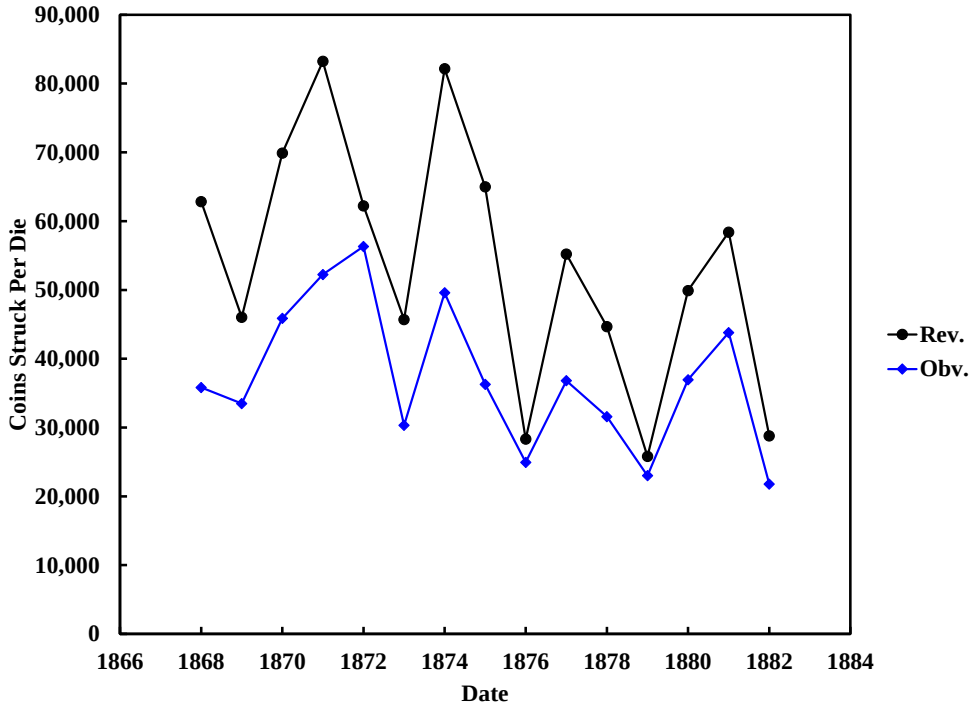

Fig. 3. Number of shillings struck per obverse and reverse die for the period 1868-1882.

This was quite unexpected. It is already known that the Obv. dies produce fewer coins than the Rev. dies, but from year to year there can be huge variations in the output per die – in some cases nearly a factor of two. It is very suspicious that the variation in the Obv. die output tracks almost perfectly the Rev. die output showing four distinct and correlated peaks and five minima. There is also an overall decline in the die output over the period shown.

This must be pointing to something in the operating procedure(s) in the Mint changing in some way from year to year over the period shown. If there was nothing changing in the Mint operations, these two lines would be roughly horizontal and uncorrelated. This may be a pointer to the activities underlying the die number experiment. If a similar plot for other denominations shows the same trends and fluctuations, especially over a longer period of time, it would confirm the variation is caused by changes in the Mint procedure(s).

For example, page 42 of the 1870 Royal Mint Report has "The process of hardening the steel of which the dies are made has undergone a modification, of which the advantages have been apparent in their increased durability. Instead of subjecting them at once to a high temperature it has been found advisable to heat them very gradually before plunging them into cold water. The result has been to impart to them a remarkable degree of hardness, and to secure increased sharpness of impression in coining." There may be sufficient hints in the Annual Royal Mint reports to identify the causes of the of the year-on-year variation of the numbers of coins struck by the dies.

Further mining of the data shown in Table 3 leads to Figure 4, where the highest known (validated) reverse die number for the shillings is plotted against the published reverse die data for 1868-1878.

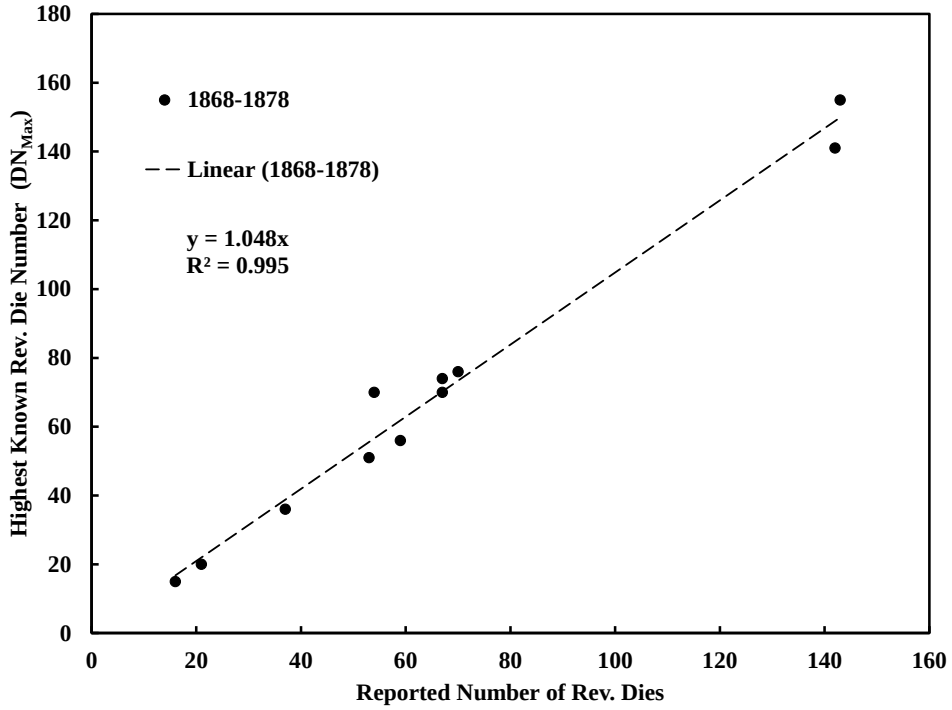

Fig. 4. Comparing the Highest known die number with published reverse die data, 1868-1878.

This is a reasonably straight line, confirmed with a linear least squares residual of 0.995. Interestingly the slope of the line at 1.048 suggests that the highest known die number (DN_{Max}) is, on average, slightly higher than the number of reverse dies reported, suggesting there will be gaps in the die number series.

Adding the calculated data from Table 3 (for 1864-1867) to the plot leads to a few points further from the straight line, confirming that care must be taken when applying averages when the annual output per die is varying significantly. The year 1879 is a special case as shillings with die numbers were issued along with shillings that did not have die numbers. These are all added to produce Figure 5, where an estimate of the number of 1879 reverse dies without die numbers can be made.

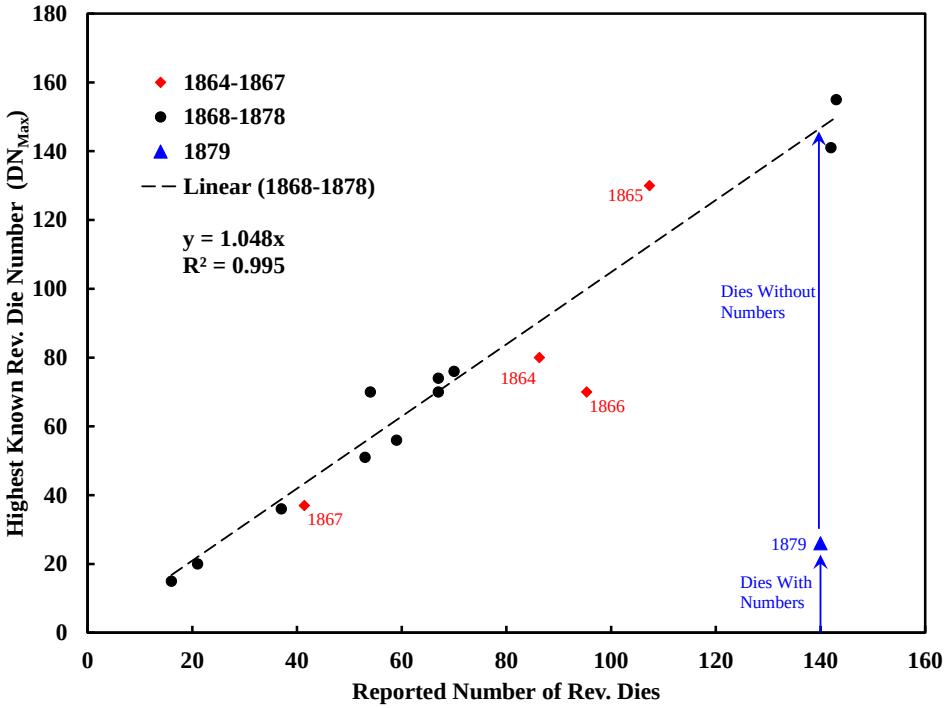

Fig. 5. Superimposing calculated data for 1864-1867 and determining the number of 1879 reverse dies.

Thus for 1879 where DN_{Max} = 26, from the chart the number of 1879 dies that do not bear a die number is estimated to be 120.7 (i.e. 140×1.048 - 26). Alternatively, simply subtracting the 26 numbered dies from the reported 140 leaves just 114 dies that bear no die number. These are reasonably consistent and in line with the observation that 1879 shillings with no die number are about four to five times commoner than those with a die number.

Discussion and Conclusions

The die numbered shillings issued between 1864 and 1879 have been avidly studied by a small group of dedicated collectors for several decades. This note is a first step in tackling just one of the dates, 1865, and publishing as many images of the reverse dies as possible. This is less than half of the story and there is a larger study remaining to be done on the obverse dies. By determining the number of obverse dies for each reverse die and identifying any die links between a given obverse die and one or more reverse dies should allow the Mint practices and number of presses in operation to be determined. This will be challenging as the obverse dies don't have the convenience of included die numbers and so significantly improved images will be needed. More promisingly, the die data published in the Royal Mint annual reports is definitely pointing towards changing practices at the mint during the die number period.

References and Acknowledgements

(1) Oddie, G. A Die Study of Victorian Shillings Dated 1865. Part 1 – Validating the Statistical Methods. BNS Blog 23 April 2023. https://britnumsoc.files.wordpress.com/2023/04/355-1865-pt1-oddie-blog-003.pdf

(2) Royal Mint Reports from 1870 onwards. 1870 includes die data back to 1868. https://library.royalmintmuseum.org.uk/archive/royal-mint-annual-reports

(3) Bull, M. *English Silver Coinage Since 1649*. 6th Ed. Spink, 2015.

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