



Volume 20

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Journal of the  
Numismatic Association of Australia

# Master dies and tools from the Royal Mint for Australian pennies and halfpennies of George V

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This article describes the preparation of master tools at the Royal Mint (London) for the Australian pennies and halfpennies of George V, thereby completing the listing of master tools for the pre-decimal bronze coinage presented previously in volumes 8 and 9 of this Journal.<sup>1, 2</sup> Perhaps more importantly, the new insights gained from this information from Engraving Department records finally allow some long-asked numismatic questions about the complexity of penny dies of George V to be addressed.<sup>3</sup> For example:

—Why did master tools for a second penny reverse die type come to be fabricated in 1912, only a year after its introduction in 1911?

—What was the origin of the new Indian obverse and Calcutta reverse penny die types in 1916?

—Why did the Royal Mint revert to the original 1911 reverse design for 1923 dated pennies?

—Why did the penny reverse die type change in 1931?

Mint records also reveal the source of the letter and device punches used by William H. J. Blakemore for engraving the reverse dies for Australian pennies and halfpennies, as well as the source of the letter punches used for the obverses. Also, an inked impression of the penny reverse

master die used to prepare 193- dated punches for Australia in September 1930 was discovered in the records (Fig. 1). While it is of the same 1911 die type as the 1930 penny, careful examination of the orientation of the numeral 3 shows that these punches could not have been used for the 1930 penny, but apparently were used in making dies for 1931 ‘dropped 1’ pennies. This observation helps explain the changeover in reverse die type for pennies in 1931. Finally, information on the preparation of dated punches at the Royal Mint can be correlated with observations of the variation in date numeral positions on the coins produced.

One of the numismatic delights of George V pennies is the variation exhibited in their dies and the substantial number of different die pairing varieties that result.<sup>4-6</sup>



Figure 1. Inked impression of the penny reverse master die of 13 Aug 1930 from Engraving Department records at the Royal Mint (London) used to prepare 193- dated punches for Australia.

These die type variations can be readily identified by the relative position of the legend with border beads or other features, including the English and Indian obverse die types, and the London, Birmingham and Calcutta reverse die types. An understanding of the different die types and how they arose begins with an understanding of modern methods of die production and the preparation of die tools.

There are several different approaches for the preparation of a master die (or matrix). The standard method begins with the preparation of a reduction punch (or hub) from a large relief model of the design prepared by the artist by employing a special reducing machine which traces over the shape of the relief model and transfers the design (at the actual size to be used on the coin) to a reduction punch using a cutting tool. An important advantage of this approach is that the design, such as a portrait of the King, can be precisely replicated at a variety of sizes for different coins (e.g. threepence to crown). Furthermore, this method also allows the relief to be altered, if necessary. For example, the relief used in the artist's original model often needs to be reduced for striking coins. The resulting reduction punch provides a positive image of the main design feature for the coin at the correct size and relief, and once hardened is used to transfer this design to a master die (negative image). Lettering for the legend of the coin, mintmarks and other features can then be added to the design by hand using individual punches, and border beading added. These features including the number of beads and their position relative to the design and legend, while seeming to be minor details, are especially important to the numismatist, since they

provide useful markers for identifying a particular master die.

Alternatively, a master die (or matrix) can be engraved by hand, aided by the use of letter punches for the legend, and sometimes device or piece punches for other design elements. This requires a higher level of skill and precision since it is done at the same size scale as on the coin itself, and the results will depend on the artistry of the engraver.

Since producing a master die is a time-consuming and expensive process, it is too valuable to be used for striking coins. However, once the master die has been hardened it can be used to make punches (or hubs) carrying a complete copy of the design as a positive image, which in turn can be used to produce copies of the master die, including dies which can have specific dates and mintmarks added. These derivative master dies can then be used to make fully dated and mintmarked punches (or hubs) for the production of many working dies for striking coins. This cascade of tool production, all derived from the same master die and carrying the same design, allows a nearly unlimited number of coins of identical design to be produced over many years.

Before proceeding to a detailed description of the development of dies for the George V bronze coinage, it is useful to discuss several items which were well known to those at the Royal Mint but are passed over in the records without comment. For example, the firms Huntsman and Bohler are both mentioned with reference to punches, with Huntsman clearly referring to Huntsman's crucible steel (invented by Benjamin Huntsman in 1756) widely used in die making, and Bohler presumably referring to steel from

the firm of Albert and Emil Böhler in Vienna. The importance of *table* is a recurring feature in mint records in the context of developing master dies and tooling. Here, *table* refers to the surface of the die, which corresponds to the field of a coin and is normally slightly convex, ideally tapering by about 0.005 inch per inch of diameter.<sup>7</sup> This plays an important role in controlling the flow of metal during the striking of coins, and there is considerable art in getting the convexity of the *table* just right. Also, as might be expected in an informal notebook that was never intended to be an official record or report, entries in the Engraving Department records are often somewhat cryptic, and gaps and omissions frequently occur. For example, in some cases tools are listed but no dates are given, making it necessary to place these in sequence but without an assigned date, and it is likely that some items were never recorded. It is also possible that other notebooks were used for entries but that these either no longer exist or are unavailable. Finally, as work increasingly shifted to the Melbourne Mint in Australia during the 1920s, entries become sparser as the Royal Mint in London performed only a distant supporting role. For this part of the story, a series of articles based on Australian mint records by John Sharples in this journal is highly recommended.<sup>8-10</sup>

Unlike the case for the later pre-decimal bronze coinage of Australia, reverse dies for George V coins were prepared well in advance of those for the obverse. Perhaps this is because, instead of being prepared using a design based on a large artist's model transferred by a reducing machine, reverse dies for the

penny and the halfpenny were directly engraved by hand into die steel using cutting tools with individual punches for lettering and other devices. Engraving Department records for this at the Royal Mint clearly show the halfpenny reverse master die (or matrix) to have been prepared first with the notation 'Designed and engraved 17-9-1910 (WHJB)' and the penny reverse 'Designed and engraved 4-10-1910 (WHJB)'. The initials are clearly those of William Henry James Blakemore, for whom an excellent short biography by T. Vincent Verheyen has recently appeared.<sup>11</sup> It is significant (and somewhat unusual) that both the design and engraving has been directly attributed to him in the records, since as a general rule Royal Mint engravers operated anonymously.

Mint records show that the letter punches Blakemore employed for the halfpenny reverse die were the same as those used in producing master die legends for some of the coinage of Queen Victoria. For example, the lettering used for ONE HALF PENNY is the same as that used on the reverse of the 'old head' half crown, and for COMMONWEALTH OF AUSTRALIA, the same as that on the obverse of the gold two pound piece. For the penny, letter punches for ONE PENNY were specially made by the firm of Walbank, while the lettering for COMMONWEALTH OF AUSTRALIA is from the obverse of the gold five pound piece of Queen Victoria. An ordinary coining table (surface curvature) was used for the die.

The original obverse master dies for the Australian bronze were not prepared until early 1911. Here, the portrait on the penny obverse was first produced from

Model A (a large relief model of George V with crown by Sir Edgar Bertram Mackennal) on 17 March using a reducing machine in normal relief. Lettering for the legend employed the same letter punches used for the new George V Imperial penny with the master die completed on 29 March. The lettering closely resembles that on Edward VII pennies but with distinctly rounded letters O, G, and D. Since this is perhaps the most extensive entry, we provide the full description from the mint records as an example of the type of information recorded:

*A reduction was made from Model A, relief normal and table cut considerably away to allow of matrix being tabled. Marked "AUST. PENNY. A." 17-3-11 mark on Orb (small sketch)*

*Size overall 24.5 mm. Size without cross and Orb 22.5 mm. A matrix made and worked up table fairly full - rather up and down. Beads in Crown worked up and - also Orb. Inscription "Georgius V D.G. Britt: Omn: Rex F.D. IND.IMP." letters used "K.G. Penny" with round O.G.D. etc as in Imperial Penny - Bead Punch Marked "Long K. G. Penny" Matrix marked "AUST. PENNY. A.1." 29-3-11 Size as Imperial overall 1.21" Inside flat 1.16" Inside Bead 1.11" Inside Head .97".*

The halfpenny obverse was also prepared using a reduction punch made from Model A in normal relief (20 March), along with lettering from the new George V Imperial halfpenny. A line running through the hair was noted for removal along with other areas to be strengthened, with the obverse master die being completed on 3 April.

In the Tables that follow, information on halfpennies is listed beginning with the date of the die or tool (where known) along with notes which briefly summarize the information from the mint records. For pennies, since several different obverse and reverse master die types exist, a third column appended to the tables shows the die type based on the author's analysis. Here, a number is used to indicate which of the two different types of obverses (e.g. Obv 1 or Obv 2) is being described, or letter for the three different types of reverses (Rev A, B or C).

We begin with tools for the halfpenny, listed below in Table 1. This shows that the H used for the mintmark for Heaton came from the small motto block (i.e. first letter of HONI in the motto of the Order of the Garter). In addition to the original 1911 dated reverse punch, dated punches were developed for 1912-H, 1913, 1914-H and 1915-H. A dated die for 1914 is also shown. It should be noted that 1915-H dated punches were not made until mid-October, and since working dies still needed to be produced, this may help explain the observed scarcity of 1915-H halfpennies.

A summary listing of penny master tools for the London and Heaton mints for 1911–1915 is presented below in Table 2. Of special note is the changeover from reverse type A in 1911 to B for 1912 and subsequent years. The question of why master tools for a second penny reverse die type came to be fabricated only one year after its introduction in 1911 was perhaps first raised by John Sharples in volume 6 of this Journal who indicated that this was a 'problem which requires access to the Royal Mint archives for its solution'.<sup>10</sup> The

Date	Notes
17 Sept 1910	Halfpenny reverse master die designed and engraved by WHJB, marked '17-9-1910'. Inscription, 'Commonwealth of Australia 1911'.
20 March 1911	Halfpenny obverse reduction punch made from Model A. Relief normal, marked 'AUST. HALFPENNY B. 20-3-11'.
3 April 1911	Halfpenny obverse master die from reduction punch with beads and lettering added, marked 'AUST. HALFPENNY B. 3-4-11'.
5 April 1911	Halfpenny obverse punch from master die (Huntsman) marked 'Aust. Halfpenny. B .1. A 5-4-11'.
19 Feb 1912	Halfpenny obverse punch from master die (Bohler) marked 'Aust. Halfpenny. B.1.B. 19-2-12' (this was spare punch intended for Heaton for 1912 dies).
21 Feb 1912	New halfpenny reverse die for 1912; small H for Heaton placed under dash and above ring of dots (H from small block motto).
1 March 1912	Halfpenny reverse punch dated 1912 made from punch dated 21-2-12.
3 March 1913	New halfpenny reverse die for 1913 made from punch dated 21-11-10. Worked up and dated 1913- marked 'AUST. HALFPENNY REV 3-3-13'.
12 March 1913	Two halfpenny reverse punches worked up from this die, marked respectively, '12-3-13 A', and, '12-3-13 B'.
4 Feb 1914	New halfpenny reverse die for 1914, marked '½D AUST - (HEATONS) 4-2-14'.
6 Feb 1914	Two halfpenny reverse punches made with H for Heaton marked respectively, '½D AUST. A', and, '½D AUST. B 6-2-14'.
6 Oct 1915	New halfpenny reverse derivative master die 1915; H added for Heaton. Marked 'AUST. HALFPENNY (H) 6-10-15'.
18 Oct 1915	Two halfpenny reverse punches made with H for Heaton marked respectively, '½D AUST. (H) A', and, '½D AUST. (H) B 18-10-15'.

Table 1. Halfpenny master tools for the London and Heaton Mints 1911–1915

relevant entry in the records which addresses this states:

*New matrix made for 1912. Edge and beads taken from punch on account of distortion in hardening (guttering) and replaced as before in matrix, lettering touched up and dated 1912.*

Although a new penny master die type was produced, it now appears that

there was no special plan to do so. The apparent reason for this was simply that there were problems encountered in hardening a punch taken from the original master die in producing the derivative master die dated 1912 for the Heaton mint in Birmingham. This was addressed by the expedient of simply removing the defective beads and edge (presumably by grinding), and using this punch to produce a new matrix (master die), but now with

Date	Notes	Type
4 Oct 1910	Penny reverse master die designed and engraved by WHJB, marked '4-10-1910'.	Rev A
17 March 1911	Penny obverse reduction punch made from Model A; relief normal, marked 'AUST. PENNY. A. 17-3-11'.	
29 March 1911	Penny obverse master die from reduction punch with beads and lettering added, marked 'AUST. PENNY. A.1. 29-3-11'.	Obv 1
1 April 1911	Penny obverse punch from master die (Huntsman) marked 'Aust. Penny. A.1.A 1-4-11'.	Obv 1
19 Feb 1912	Penny obverse punch from master die (Bohler) marked 'Aust. Penny. A.1.B 19-2-12' (this was a spare punch intended for Heaton for 1912 dies).	Obv 1
22 Feb 1912	New penny reverse master die for 1912, with edge and beads removed from punch on account of distortion in hardening and replaced, lettering touched up and dated, 1912; small H for Heaton placed under ornament. Matrix marked '22-2-12'.	Rev B
1 March 1912	Penny reverse punch from master die of 22 Feb 1912 marked '1-3-12'.	Rev B
22 Feb 1913	New penny reverse die for 1913 marked '22-2-13'.	Rev B
12 March 1913	Two penny reverse punches marked respectively, '12-3-13 A', and '12-3-13 B'.	Rev B
?	Penny reverse master die for 1914.	Rev B
?	Dies dated for 1915 (with notation that this uses new 5).	Rev B
6 Oct 1915	New penny reverse die with H for Heaton, as before marked 'AUST. PENNY (H) 6-10-15'.	Rev B
19 Oct 1915	Two penny reverse punches for Heaton marked respectively, 'AUST. PENNY. H. A. 19-10-15', and, 'AUST. PENNY. H. B. 19-10-15'.	Rev B

Table 2. Penny master tools for the London and Heaton Mints for 1911–1915 Coins.

the addition of 177 border beads in place of the 174 that were on the original reverse master die. This new reverse die type has been labelled as the 'Birmingham' type or Reverse B. The view that this is an 'accidental' die type is re-enforced by the identical language in the records for the following year stating—*New matrix made for 1913* (i.e. routine production of another dated derivative master die, but this one now derived from the new reverse of 1912). However, this can be viewed as

a very successful accident since this die type became the standard reverse die for all pennies from 1912–1915, for 13 of the 26 years that George V pennies were struck, including the final coinage years from 1932–1936.

The records also show that in addition to an original 1911 dated reverse punch, dated punches were made for 1912-H, 1913 and 1915-H. While dated dies for 1914 and 1915 are shown, notation is unusually sparse and no dates for the tools are given.

Date	Notes
29 March 1916	New halfpenny reverse derivative master die for 1916, dated with letter I for India (from K.E. penny Maundy) in place of H- position as H marked. '½D AUST. (I) 29-3-16'.
7 April 1916	Two halfpenny reverse punches worked up 7-4-16, marked respectively '½D AUSTREV. (I) A ROYAL MINT LONDON 1916', and, '½D AUST.REV. (I) B ROYAL MINT LONDON 1916'.
1 May 1916	Two further halfpenny obverse punches were made to replace punches sent to India marked respectively, '½D Aust.B.1.C', and, '½D Aust.B.1.D 1-5-16'.
30 May 1916	Two halfpenny obverse punches marked C and D (1-5-16) broke in hardening; two more were made, marked respectively, '½D AUST.B.1.E', and, '½D Aust.B.1.F 30-5-16'.

Table 3. Halfpenny master tools for the Calcutta Mint 1916.

Date	Notes	Type
15 March 1916	New penny obverse master die made exactly as the first but to suit the new reverse matrix, marked 'AUST. PENNY. A.2 15-3-16'.	Obv 2
29 March 1916	New penny reverse master die made from punch (beads ground away) dated 1916 and marked '1D.AUST - (I) FLATTER FORM 29-3-16'. Letter I for India placed above dots, I from K.E. Maundy Penny.	Rev C
31 March 1916	Two penny obverse master punches made and marked respectively, 'Aust. Penny. A .2. A', and, 'Aust. Penny. A .2. B. ROYAL MINT LONDON - 1916' (31-3-16). One to go to India.	Obv 2
1916	Two penny reverse master punches made and marked respectively, 'AUST. PENNY. (I) A. ROYAL MINT LONDON 1916', and, 'AUST. PENNY. (I) B. ROYAL MINT LONDON 1916'.	Rev C

Table 4. Penny master tools for the Calcutta Mint 1916.

Because of the hazards of sea transport during the First World War, war-time production of the bronze coinage for Australia was transferred to the mint in Calcutta. The listing of halfpenny master tools for this in Table 3 indicates that the punch used for the mintmark letter I (for India) came from the obverse legend of the Edward VII Maundy penny. Because there are no changes of die type, it is of numismatic interest mainly in that it shows that fully dated and mintmarked tools were

created for 1916. The lack of entries for 1917 and 1918 halfpennies suggests that the dies for these were apparently produced in Calcutta from the 1916 tools that were already mintmarked. This would seem to be confirmed by the observation that no variations in date or mintmark position are seen on these coins.

The remarkable feature of Table 4, which shows penny master tools developed for the Calcutta Mint, is the introduction of new penny obverse and

reverse types. The question of why new Indian obverse and Calcutta reverse penny die types were introduced in 1916, when the original types should have sufficed, was raised by John Sharples in volume 6 of this Journal.<sup>10</sup> It is now clear that the Indian obverse master die (Obverse 2) was in fact deliberately produced by the Royal Mint to match a new reverse die with a flatter table. The record for this reverse die states:

*A new matrix was made from punch (beads ground away) and a flatter table was made dated 1916 and work deepened - marked "1D.AUST - (I) FLATTER FORM 29-3-16".*

*Letter I for India placed above dots, position as H for Heatons, I from K.E. Penny Maundy.*

After the punch was used, 179 border beads were added to the die, making it possible to readily distinguish it as a new reverse die type. This has been labeled as the Calcutta type or Reverse C. The so-called Indian obverse die with 178 instead of 177 border beads was also deliberately produced in order to match the flatter table of the Calcutta reverse, as stated in the records:

*A second matrix was made details size etc. exactly as the first - but table less round to suit the new reverse matrix - marked "AUST. PENNY. A.2 15-3-16"*

It is now clear that the new obverse and reverse master dies associated with the mint in Calcutta were introduced to allow striking pennies using a flatter table. Curiously, the dates in the records show the obverse die as being dated *two weeks* before the reverse, rather than the other

way round. Nonetheless, the Indian obverse die has played an important role in Australian numismatics, especially since the remaining tools and dies from Calcutta were later sent to Melbourne in 1920, with the Indian obverse die eventually emerging as a key identifying feature for the 1930 penny.

Finally, it can be seen that Table 4 for penny master tools resembles that of Table 3 for the halfpennies. Of numismatic interest, the production of fully dated and mintmarked tools for 1916 demonstrates that the long-known 1916 missing mintmark penny must simply be due to a filled die. As for the halfpennies, it also seems clear that the dies for 1917 and 1918 pennies would have been produced in Calcutta from the 1916 tools, as confirmed by the lack of observation of variations in date or mintmark position on these coins.

With the completion of the master tools for Calcutta, all of the different George V penny die types had been created. These include two different obverses, the so-called English die (Obv 1) and Indian die (Obv 2), which can be easily identified by the alignment of the final upright of the N of OMN with border beads as shown in Figures 2 and 3.

There are three different reverse die types. These include the London die (Rev A), Birmingham die (Rev B) and Calcutta die (Rev C), which can be distinguished by the relative position of the letters ALIA of AUSTRALIA with border beads as shown in Figures 4–6.

Halfpenny master tools for the Melbourne Mint 1921–1930 are listed in Table 5. This includes new obverse and 1922 dated reverse tools made in late 1921. The following year new 1923 dated reverse and obverse master dies were produced for



Figure 2. Obverse 1 is the 'English' die, easily identified by the last stroke of the N of OMN being aligned between border beads, of which there are 177. This is the original penny obverse die of the series used at the London, Heaton, Melbourne and Sydney Mints.



Figure 3. Obverse 2 is the 'Indian' die, easily identified by the last stroke of the N of OMN pointing to a border bead. This penny obverse die was used at the Calcutta, Melbourne, Sydney and Perth mints. There are 178 border beads.



Figure 4. Reverse A is the 'London' die, and can be distinguished by the relative position of the letters ALIA of AUSTRALIA with border beads, with the tops of the letters AL aligned with and IA between beads. This is the original penny Reverse die of the series used at the London, Melbourne and Sydney mints, and has 174 border beads.



Figure 5. Reverse B is the 'Birmingham' die, and can be distinguished by the relative position of the letters ALIA of AUSTRALIA with border beads, with the tops of A IA aligned with and L between beads. Reverse B was used at the Heaton, London, Melbourne, Sydney and Perth mints, and has 177 border beads.



Figure 6. Reverse C is the 'Calcutta' die, and can be distinguished by the relative position of the letters ALIA of AUSTRALIA with border beads, with the tops of A IA aligned between and L with beads. Reverse C was used at the Calcutta, Melbourne and Sydney mints, and has 179 border beads.

Melbourne using punches from 1916. It seems likely that one of the punches from this 1923 dated halfpenny master die was employed on September 20, 1923 in Melbourne to prepare three dies for striking the rare 1923 halfpennies.<sup>8</sup> The final items listed are a new reverse master die and punch dated 193- , designed to aid 1930s die production at the Melbourne Mint.

Penny master tools for Australia for 1920–1930 from Engraving Department records are shown in Table 6. In discussing

Date	Notes
23 Nov 1921	Halfpenny reverse master die dated 1922 made and marked 'AUST. HALFPENNY. REV. MAT. 23-11-21'.
29 Nov 1921	Halfpenny obverse punch made up and marked '½D AUST.B.1.G. 29-11-21. ROYAL MINT LONDON 1921'.
2 Dec 1921	Two halfpenny reverse punches marked respectively (2-12-21), 'AUST. ½D. REV. A ROYAL MINT LONDON 1921', and, 'AUST. ½D. REV. B ROYAL MINT LONDON 1921'.
2 Dec 1921	Halfpenny obverse punch made up and marked '½D AUST.B.1.H" 2-12-21 ROYAL MINT LONDON 1921'.
9 Sept 1922	Halfpenny reverse master die dated 1923 made for the Melbourne table, full size inside flat 0.96" as obverse, marked 'AUST. HALFPENNY. REV. MAT. ROYAL MINT LONDON 1922'; made from punch marked (I) B Royal Mint London 1916.  Two halfpenny reverse punches worked up and marked respectively, 'AUST. HALFPENNY. REV. A ROYAL MINT LONDON 1922', and, 'AUST. HALFPENNY. REV. B ROYAL MINT LONDON 1922'.
12 Sept 1922	Halfpenny obverse master die made for Melbourne from punch marked '½D AUST.B.1.E 30-5-16', with new master die marked 'AUST. HALFPENNY OBV MAT. 12-9-22 ROYAL MINT LONDON 1922.'  Two halfpenny obverse punches worked up and marked respectively, 'AUST. HALFPENNY. OBV. A ROYAL MINT LONDON 1922', and, 'AUST. HALFPENNY. OBV. B ROYAL MINT LONDON 1922'.
21 Aug 1930	Halfpenny reverse master die dated 193- and marked 'AUST. HALFPENNY. REV. MAT. 21-8-30'.
9 Sept 1930	Reverse punch made for Australia, dated 193- and marked 'AUST. HALFPENNY. REV. A. 9-9-30 TOWER'.

Table 5. Halfpenny master tools for the Melbourne Mint 1921–1930

Table 6, reference to the summary listing of George V penny die pairings in Table 7 which follows is especially helpful in understanding the numismatic complexity of these coins. This lists the normal die pairings by year(s) along with any variety die pairings with a relative rarity estimate (S = scarce, R = rare and ER = extremely rare), followed by brief clarifying comments (note: that 1931 has 4 die pairings, shown in two rows). An overall examination of Table 7 shows numerous

die pairing varieties from 1920 through 1931, all made possible by the three new die types originally introduced in 1912 and 1916. Detailed discussion of the die pairings shown in Table 7 is available elsewhere.<sup>6, 8, 10</sup>

In examining Table 6 it should be pointed out that no penny or halfpenny master tools for 1919 or tools and dies sent directly to Melbourne from Calcutta appear in the Engraving Department records. Here, the records simply jump

<b>Date</b>	<b>Notes</b>	<b>Type</b>
1 Dec 1920	Penny reverse master die dated 1921 marked 'AUST. PENNY. REV. 1-12-20'.	Rev B
8 Dec 1920	Penny reverse punches marked for Australia (8-12-20) 'AUST. PENNY. REV. A. ROYAL MINT LONDON 1921'.	Rev B
22 Sept 1921	Penny reverse master die dated 1922 marked 'AUST. PENNY. REV. MAT. 22-9-21'.	Rev B
25 Sept 1921	Two penny obverse punches worked up and marked respectively (25-9-21), 'AUST. PENNY. A.2.C. ROYAL MINT LONDON - 1921', and, 'AUST. PENNY. A.2.D. ROYAL MINT LONDON - 1921'.	Obv 1
1 Oct 1921	Two penny reverse punches dated 1922 marked respectively (1-10-21), 'AUST. PENN. REV. A. ROYAL MINT LONDON 1921', and, 'AUST. PENN. REV. B. ROYAL MINT LONDON 1921.'	Rev B
14 Oct 1921	Penny obverse punch marked 'AUST. PENNY. A.2.E. ROYAL MINT LONDON - 1921. 14-10.21'.	Obv 1
12 Sept 1922	New penny obverse master die to go to Melbourne with new series of matrices asked for. Matrix worked up and marked '12-9-22 AUST. PENNY OBV MAT ROYAL MINT LONDON 1922'.	Obv 1
12 Sept 1922	New penny reverse master die for Melbourne—to make this we went back to the original (4-10-1910) to get full edged table. Two punches were made: full date cut away 1 marked 'AUST. PEN. REV.MAT.FROM ORIGINAL MAT. 12-9-22'. Matrix from above punch worked up and dated 1923, marked 'AUST. PENNY. REV. MAT. ROYAL MINT LONDON 1922' (replaced).	Rev A
3 Oct 1922	Two penny obverse punches worked up and marked respectively (3-10-22), 'AUST. PENNY OBV A ROYAL MINT LONDON 1922', and, 'AUST. PENNY OBV B ROYAL MINT LONDON 1922'.	Obv 1
18 Oct 1922	Two penny reverse punches dated 1923 and marked respectively (18-10-22), 'AUST. PENN. REV. A. ROYAL MINT LONDON', and, 'AUST. PENN. REV. B. ROYAL MINT LONDON'.	Rev A
13 Aug 1930	A penny reverse master die was made and dated 193- only for punches for Australia worked up as usual and marked 'AUST. PENNY. REV. MAT. 13-8-30 TOWER'.	Rev A
11 Sept 1930	Penny reverse punch dated 193- and marked 'AUST. PENNY. REV. A. 11-9-30 TOWER'.	Rev A

Table 6. Penny master tools for the Melbourne Mint 1920–1930

from 1916 to 1920 on the same page (1916 to 1921 in the case of the halfpennies). While this is understandable in the case of Calcutta, why no 1919 tools are listed seems surprising. Fortunately, other records from the Melbourne Mint

summarized by John Sharples help address this gap showing several batches of Obverse 1 and Reverse B dies being received from London during 1919, but no tools<sup>10</sup>, perhaps explaining the observed gap in the Engraving Department records.

Year(s)	Die Pairing	Comment
1911	1 + A	
1912-15	1 + B	1912-H, 1913, 1914, 1915, 1915-H
1916-18	2 + C	All I mintmark
1919	1 + B	Dot varieties exist
1920	2 + C, 1 + C (R)	Dot varieties exist
1921	2 + B, 1 + B (R)	Obv 1 are Melb Mint
1922	1 + B, 2 + B (S)	Obv 2 are Perth Mint
1923	1 + A	
1924	1 + A, 2 + A (R)	Obv 2 are Sydney Mint
1925-26	1 + A	
1927	1 + A, 2 + A (R)	
1928	1 + A	
1929	1 + A, 2 + A (S)	
1930	2 + A	Obv 1 reported
1931	1 + A, 2 + A (ER) 1 + B, 2 + B (R)	Dropped 1 type
1932-36	1 + B	1933/2 overdate exists

Table 7. Summary listing of George V Australian penny die pairings.

The production of 1920 pennies depended on the remaining Obverse 2 and Reverse C tools and dies sent to Melbourne from Calcutta. This situation was likely due to the reluctance of Melbourne Mint to order (and pay for) new bronze coinage tools when the expectation was that a new nickel coinage would be adopted.

The initial entries in Table 6 show a 1921 dated reverse B die and punches which were made in December 1920 in response to an urgent telegraphed request on 24 November from the Melbourne Mint to London ‘Owing delay approving nickel pair bronze penny punches required urgently’.<sup>10</sup> No obverse penny tools were supplied. This may help explain why the normal die pairing for 1921 pennies is reverse B paired with Obverse 2 dies from

Calcutta. Eventually, of course the proposed nickel coinage was abandoned, and it was necessary for the Melbourne Mint to order new bronze coinage tools. These included master dies and punches for Obverse 1 and Reverse B dated 1922 that were fabricated in September and October 1921.

Among the most interesting tools are those made the following year, when the Royal Mint reverted to the original 1911 Reverse A design for 1923 dated pennies. Why this occurred has long been unknown, and was perhaps first raised in 1992 by John Sharples in volume 6 of this Journal where he says:

*To make life interesting, while the 1922 hubs had been derived in London from*

*the “Birmingham” masters, this new issue was for some reason based on the original 1911 “London” master die form.*<sup>10</sup>

The answer, it seems, is once again revealed by Engraving Department records that show:

*Rev. Mat. For Melbourne - to make this we went back to the original mat (4-10-1910) to get full edged table.*

Thus, it appears the reason the mint went back to the original master die of 1911 was to have a wider table to work with than that on Reverse B, resulting in Reverse A tools being re-introduced. This revival of Reverse A, along with the Calcutta Mint earlier sending their remaining stock of Obverse 2 and Reverse C tools and dies to Melbourne, created a situation where all five different George V penny die types were available at various times during the period from 1920 to 1931. As can be seen in Table 7, this situation has greatly enhanced the numismatic complexity of Australian pennies.

The re-introduced Reverse A die type was later used for the 1930 penny. One of the pleasant surprises during this research was the discovery in the records of an inked impression of the penny reverse master die used to prepare 193- dated punches for Australia on 11 September 1930. This is shown in Figure 1. Inspection shows this is Reverse A, with careful examination of the orientation of the numeral 3 making it clear that these punches could not have been used for the 1930 penny, a result consistent with previous work by John Sharples which shows a date of 13 August 1930 for the last

batch of 1930 penny dies from the Melbourne Mint’s workshop.<sup>9</sup> However, close study of the inked impression suggests that the 193- punches from the Royal Mint (London) *were* used in making dies for 1931 ‘dropped 1’ pennies, which were the last Australian pennies to employ Reverse A.

Unfortunately, the available Royal Mint Engraving Department records reported here do not go beyond 1930 for George V bronze coinage. However, we know from direct numismatic observation that a changeover to Reverse B occurred during the final years, beginning with ‘normal date’ 1931 pennies, and later with the die pairing combination for pennies becoming exclusively Obverse 1 and Reverse B from 1932–36. The observation of the inked die impression of penny reverse A from August 1930 shows that the master tools shown in Table 6 *could not* have been used to produce reverse B dies for subsequent George V pennies through to 1936. However, it is important to note that according to John Sharples, Melbourne mint records show that only 193- dated punches were sent, arriving on 7 November 1930. The halfpenny punch failed on December 24, and the Melbourne Mint then sent for a new set of tools, this time master dies.<sup>9</sup> There is important additional information on this period at the Melbourne Mint published by W. J. Mullett, that shows a 193- dated penny punch was received on 7 November 1930 from which a master die was made with the addition of a final date numeral 1, and that it was then used to produce a 1931 dated penny punch on January 22, 1931.<sup>12, p.17</sup> This clearly accounts for the 1931 ‘dropped 1’ pennies with reverse A. Mullett also reports that a new penny master die dated

193- was received from London on 18 March 1931, with the records showing that six 1931 penny reverse dies 'off Melbourne Hub off LMD 193' were produced based on this London master die on 17 August 1931, although he argues that this must be in error since the master die was supplied hardened.<sup>12, pp.18,19</sup> We would now argue that the original notation in the Melbourne Mint records is in fact correct, clearly showing that a derivative 1931 dated punch (hub) had been prepared using the new 193- dated master die from London, although requiring the intermediate step of a fully dated die. Furthermore we infer that this new master die must have been of the penny reverse B type, with the Melbourne produced punch corresponding to 'normal date' 1931 pennies. This interpretation would account for the changeover in the penny reverse from A to B during 1931 and the use of reverse B on all George V pennies from 1932–36.

Besides a basic understanding of the development of master tools and die pairings for George V bronze coinage, it is possible to consider variations in the working dies produced. For example, the Engraving Department records are sufficiently detailed for it to be relatively straightforward to attempt to correlate these with observations of the variation of date numeral positions on bronze coins produced from 1911 through 1918. Beginning in 1919, analysis of date numeral positions becomes much more complicated and is beyond the scope of this article.

In the case of the halfpennies from 1911–18 only the 1913 coin has been noted as having date numeral variations.<sup>4, 5, 13</sup> This is generally consistent with Engraving

Department records that show dated (and mintmarked) punches were prepared for all years from 1911–1916, except 1914 where a dated die is shown. The observation that 1913 halfpennies exhibit date numeral variations indicates that some dies were individually dated, with Dean showing photographs of three different configurations. The question then becomes whether it might be possible to determine which of these arose from a fully dated punch. Here, a survey of coins to look for the most plentiful date type might be used, coupled with examination to determine whether more than one individual working die was used for each date type. This would likely require a large sample in good enough condition that die markers such as die cracks or die doubling can be identified. It should be noted that for this purpose die cracks provide especially distinctive 'fingerprints'.

For pennies of 1911–18, the situation appears more complicated, with date variations observed for 1913, 1914 and 1915 coins.<sup>5, 13</sup> In this case, the records again show dated punches for all years from 1911–16, except 1914 and 1915 where dated dies are reported. A similar procedure to that suggested for the 1913 halfpenny may be followed in order to identify which observed date configurations might have arisen from fully dated mint tools. It is interesting to note that only pennies produced at the Royal Mint show evidence for individual dating, this being an institution where dating coinage dies was probably routine. In contrast, the evidence suggests that dies for all of the mintmarked bronze coins were produced from fully dated tools, likely including derivative tools made at the Calcutta Mint for 1917 and 1918.

It should be pointed out that the early Commonwealth coinage of Australia remains an active area for numismatic research, as shown by several very recent articles published in *The Australasian Coin & Banknote Magazine*. These include the detailed biographical article on Blakemore by T. Vincent Verheyen<sup>11</sup>, and a series of articles by Jon Saxton.<sup>13,14</sup> In numismatics it is often the ‘why’ questions that are the most fascinating, and much of the motivation for this article has been to help address such questions and provide context for understanding these fascinating coins.

### Acknowledgements

The author would like to express special appreciation to Mr G P Dyer, formerly Curator and Librarian, Royal Mint, for supplying copies of Engraving Department records crucial to this study, and to Professor Peter P Gaspar for supplying information for reference 7.

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