How to Make a Seventeenth Century Token[1]

Gary Oddie

The manufacture of coins, tokens and counterfeits has always been of interest. From hammered, machinery and early screw presses to modern high speed presses and casting, the skills of the die cutters and engravers combined with the available metallurgy and machinery has always set the limits on what can be achieved. In a previous article the evolution of screw presses and their possible use in striking seventeenth century tokens was described[2].

In early 2013 an item appeared on eBay with the following description and a few photographs[3].

> 4 17TH CENTURY GLOUCESTER FARTHINGS & MOLDS/DIES USED TO MAKE THEM
>
> DATED 1673 IN A PRESENTATION BOX
>
> NOT AN EXPERT THEY ARE A FAMILY HEIRLOOM AND BELONGED TO MY GRANDFATHER I THINK THE DIES/MOLDS ARE PRETTY RARE

Fig. 1. Original eBay advert and photograph: dies in the middle, tokens either side.

The box and contents were quickly purchased (sadly I missed them) and broken up. The dies reappeared at auction a few months later as two separate lots[4]. Subsequent correspondence has managed to reunite the two dies with the box and tokens, though the box had suffered some damage during the extraction of the dies. The original vendor confirmed the group had been bought in the 1940s by his great uncle, a collector from the Gloucester area. He had seen the original receipt from a dealer, but could not find it.

The photographs below show the dies (Approximately 110% scale) and the die face (140%).

Fig. 2a. Obverse die and detail for Gloucester W81 – 35h × 36w × 37d.

Fig 2b. Obverse die for Gloucester W83 – 23h × 38w × 32d.

The two dies share common features; being roughly square/rectangular, with a curved front containing a flat circular die face, and the rear-side slightly convex. The Nags head die has two dowel peg holes on one side and 3 and 4 punch marks on two of the other sides. The square/rectangular dies explain the usual appearance of the die rotations found in many issues.

At some time in the past, these two dies were probably part of a larger group. Other dies from the group along with wax impressions of the above dies were displayed by Owen Parsons at the British Numismatic Society in 1959[5].

EXHIBITIONS

Session 1959

February

By Mr. Owen Parsons on behalf of the Gloucester City Museum:

1. Original steel die for the reverse of a Gloucester City farthing token 1667. The die reads: THOMAS • PRICE • MAIOR • 1667, in centre C G.
2. Gloucester City farthing token 1667, the reverse struck from the above die. BW 80.
3. Old sealing-wax impression of reverse die, No. 1 above.
4. Old sealing-wax impression of obverse die for No. 2, the pair to No. 1. (This die is not now known.)
5. Gloucester City farthing token 1669. BW 81.
6. Old sealing-wax impression of the obverse die for the above. (This die is not now known.)
7. Farthing token AT • THE • NEGS • HEAD (A horse's head) IN • GLOUCESTER • 1654. • C • / I • A BW 83.
8. Old sealing-wax impression of the obverse die for the above. (This die is not now known).
9. Old sealing-wax impression of the reverse die for the above. (This die is not now known.)

Fig. 3. Original notice of possible survival of the dies.

In an earlier article Parsons had also presented another group of defaced Royal Mint dies from Gloucester Museum and speculated on a connection with the Gloucester based solicitors who acted for the family who owned Archbishop Sharp's collection[6]. The presence of the Gloucester token dies in the same Museum may not be a coincidence.

Having speculated about the manufacturing process for seventeenth century tokens, the dies provided a useful excuse to carry out some practical tests, though not on the original dies!

First a screw press was bought, with a four foot arm and 24lb weight, along with an extra 30lb weight. These were all available on the well-known auction site, where it would seem much of our industrial heritage is available at little more than the scrap metal price! The press was made by W. Benson of Robin Hood St., Nottingham. The business ran 1855-1963 and there is a web site dedicated to preserving its history[7]. Indeed I have not been able to find a supplier of a new screw press, as they were replaced by hydraulic presses in the second half of the 20th century. The screw has a 2-start thread and so turns more slowly than the 3 or 4-start typical of coining presses[8].

A frame was made to bring the press and arms to a useable height. At this point it becomes clear how technology has progressed since the seventeenth century; electric drills with high speed steel and nitride coated bits, band saw, electric welder, standard taps, dies, nuts and bolts etc and not forgetting the car, trailer and hydraulic engine hoist used to collect the press which weighs about 300kg! These all make it possible for this to be a simple DIY project.

A design for a token was sketched as shown below;

Obv: GARY♦ODDIE♦AT♦THE♦TOKEN ★
A screw press
Rev: IN♦SAINT♦NEOTS♦2013 ❖ ★
HIS HALFE PENY the letter I forming the numerator of the denomination ½
Details: 20mm diameter to outer circle

Fig. 4. New 17th C token design.

For these first tests, it will be easier to work with mild steel rather than tool steel. Thus metal was cut and machined to the approximate size of the real dies. Dave Greenhalgh, also known as Grunal the moneyer, was commissioned to cut the dies.

Fig. 5. Creating new dies and close-up of finished die face.

Two clamps were made to hold the dies in the press. At this point a possible use for the two holes in the die in figure 2b above became clear. If the upper die holder has two short dowels, it makes installing the die very simple as it just locks into position located by the dowels. The photographs below show the dies installed in the press and ready to use.

Fig. 6. Close up of new dies clamped into the screw press.

Fig. 7. Screw press ready for use.

For the first few trial strikings, 20 mm pewter blanks were used, slowly increasing the length of the throw of the arm.

The first thing that was apparent was that the spring in the arms caused a recoil of the press almost back to the starting point. This is consistent with a contemporary observation of screw presses at the Tower Mint[8].

> ". . . . the arms do come down quickly,
> and fly back of themselves".

Fig. 7a. First test on pewter blanks.

A few minutes later and copper and brass blanks were tried and produced the token shown below.

Fig. 8. A "New" Huntingdonshire 17thC token.

Modern cold-rolled brass sheet required the hardest throw to produce an impression. My "gut feeling" and "back-of-the-envelope" calculations suggested that around 20 tonnes force were required to strike a 17th century halfpenny token. The next step was to measure this force. A 0-25 tonne load cell was acquired and placed in the press and a position sensor (LVDT – linear variable displacement transducer, 0-100 mm) were attached to the upper die clamp.

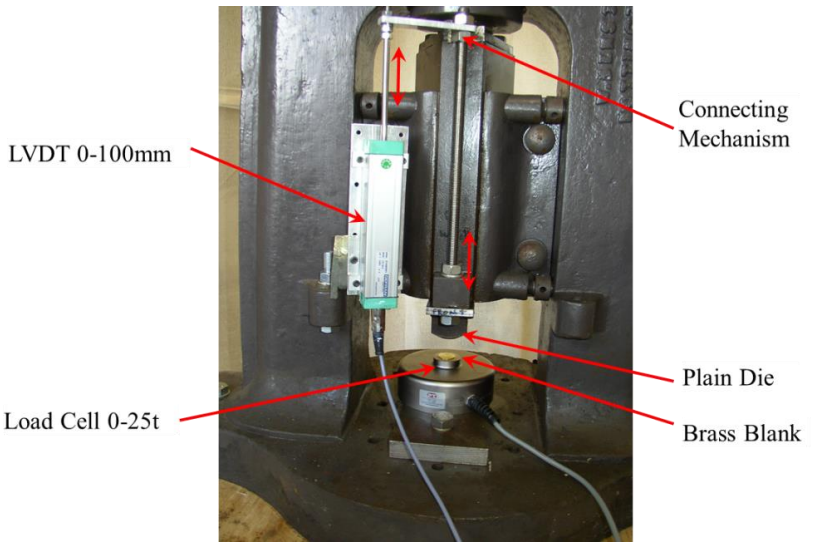

Fig. 9. Instrumenting the screw press (Sensors).

The transducers were wired up to give a voltages proportional to load and position and these voltages recorded using a data logger (PicoLog ADC-20).

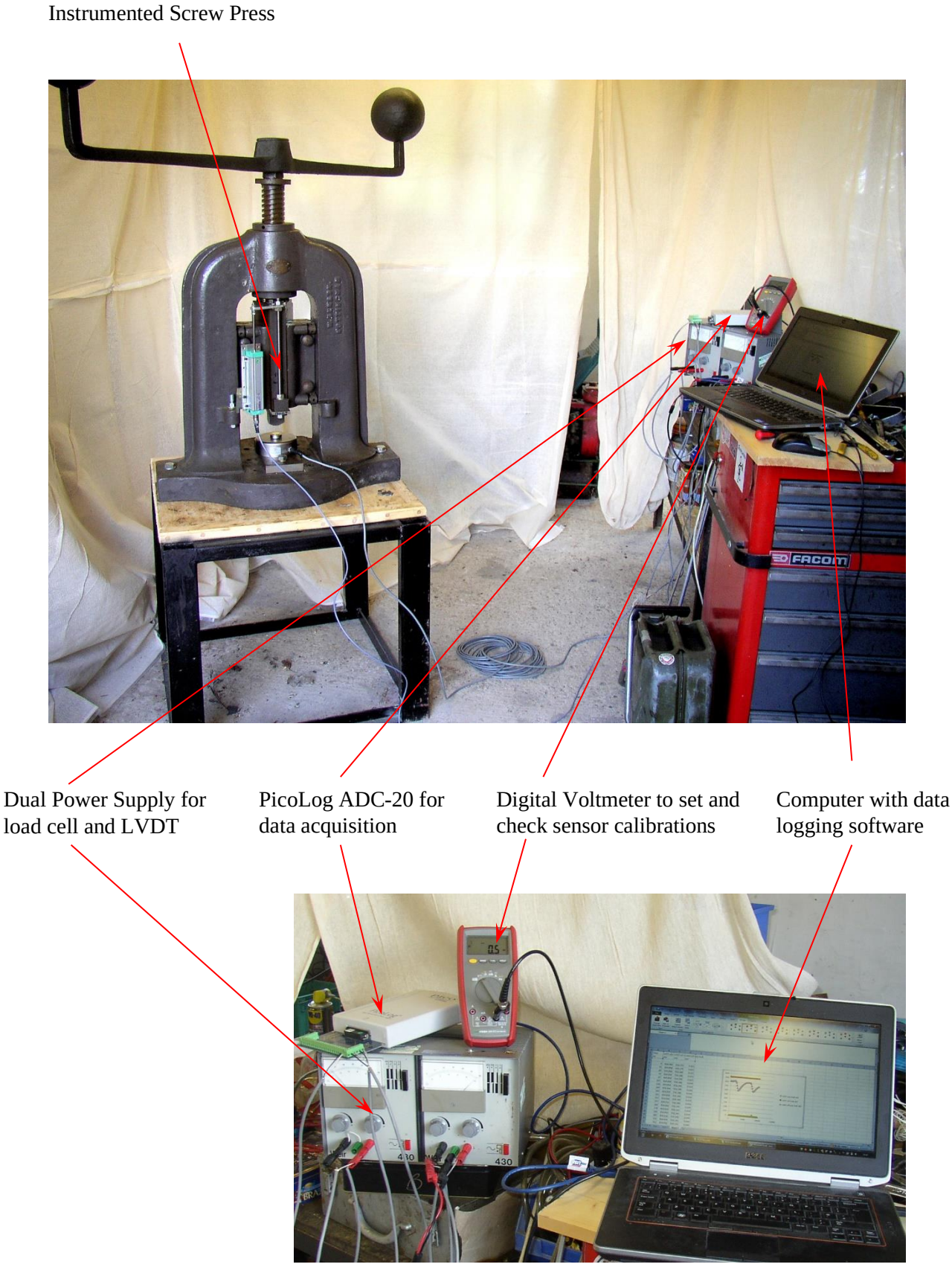

Fig. 9a. Instrumenting the screw press (Data Acquisition).

The data was analysed using Excel and the plot below shows the results of two consecutive throws. The first is a gentle throw, the second much stronger. The red line shows the position of the die and the blue line the force.

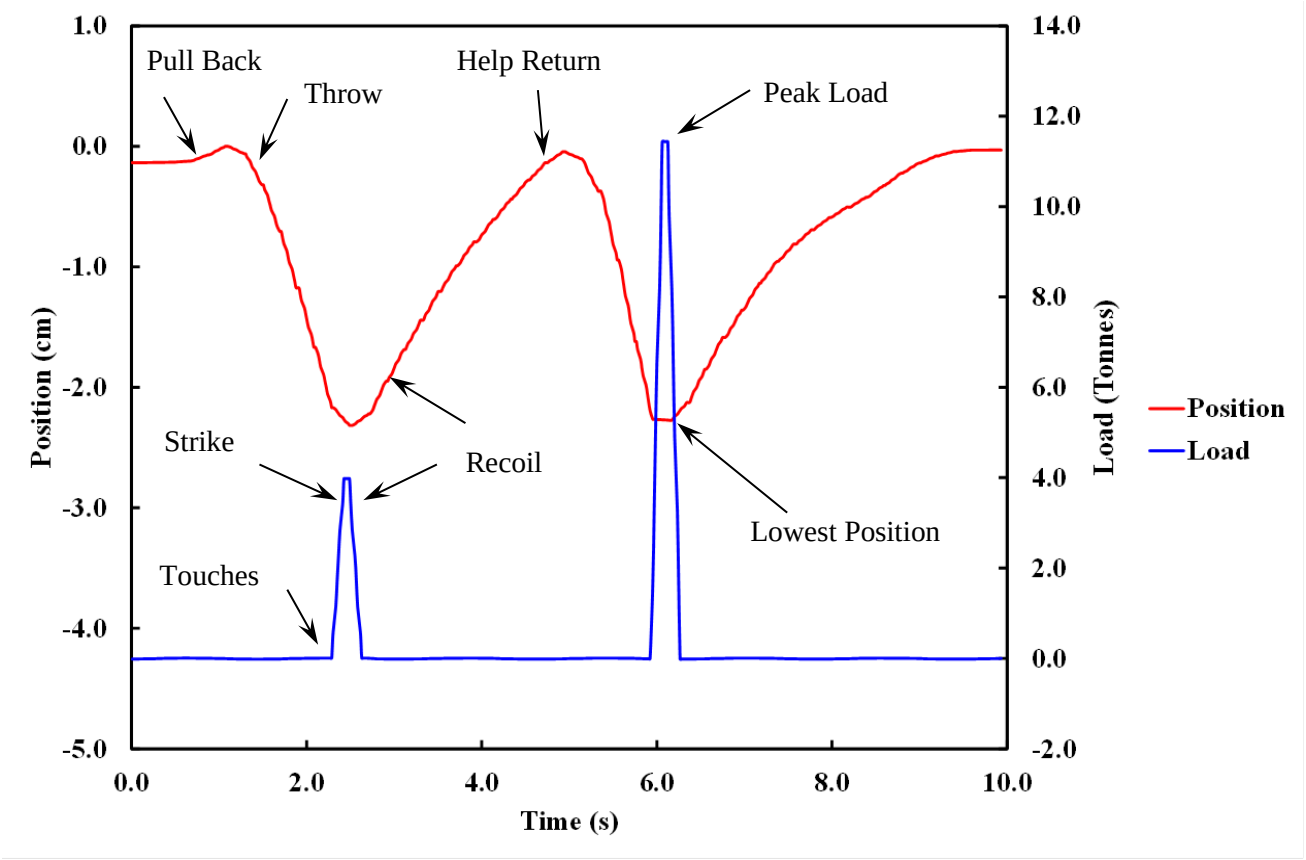

Fig. 10. Measuring die position and load during striking.

For the first strike, the die movement is about 2.5cm and peak load 4 tonnes. For the second strike the die movement is about the same and the peak load is 12 tonnes (118 kN). Tests were repeated and with practice the maximum load measured was 18.3 tonnes (179 kN) and this is without using straps/ropes on the arms to achieve a longer and faster throw. The rebound/recoil makes this a surprisingly efficient process and it is possible to strike a token every four seconds. This is a consequence of the natural frequency of this whole mechanical set-up - the weights, the length of the arms, the elasticity of the arms, the pitch of the thread etc. Larger weights and longer arms will have a lower frequency, but be capable of higher striking forces.

Based on these tests, the following is suggested as a business model for the original issues of 17th century tokens. A minimum order would be 1000 halfpennies or 2000 farthings at a cost to the trader of £2. For this a pair of dies is cut, costing £1 and the tokens are struck with a face value of £2 from 10s worth of metal. The trader is happy, having converted silver or gold into tokens of the same value; well, a trader is unlikely to accept a loss, no matter how altruistic his motives are for providing small change. The profit margin on the metal is about 10s for the moneyer. A more likely scenario might be a £3 order for which £4 worth of tokens are supplied, dies cost £1, profit on the metal £1, profit for the tradesman £1 and then everyone is happy.

With all of the tooling available, a pair of dies would take less than an hour to cut. Cutting 1000 blanks from pre-prepared sheet or strip (using another screw press), placing the blanks in the press, striking every 4 seconds would take 3 people one morning. With assistants cutting the blanks, a single press could easily produce 5000 tokens per day.

If we take 20,000 different tokens issued between 1648 and 1672, which is an average of about 3 token issues per day. The output of the peak issuing years in the mid 1660s could easily be accomplished with just a handful of screw presses.

When working this quickly it is also possible to see how some common errors, such as clipped flans, appear in seventeenth century tokens. Some tokens stick to the dies and produce a brockage if they are not quickly prised out with the point of a knife.

Fig. 11. Minting errors: Straight, curved and multiple edge clips and a brockage.

References and Acknowledgements

1. Based on a talk originally given at Token Congress in Northampton, 2014. A short version of this blog can be found, with fewer and smaller pictures, in G. Oddie 'How To Make a Seventeenth Century Token' *TCSB* v11 n10 pp369-376, March 2016, and also G. Oddie 'How To Make a Seventeenth Century Token' *Coin News*, v60 n7 pp70-73, July 2023.
2. G. Oddie. A Token Screw Press. *TCSB* v11n1 pp4-11.
3. Item Number – 330853022494. Ended on 04 January, 2013 00:28:44 GMT.
4. London Coins, Auction 140, lots 1162 (W81) and 1163 (W83). 2nd and 3rd March 2013.
5. O.F. Parsons. British Numismatic Society Exhibition, February 1959. BNJ 1958-9 v29 pp430-1.
6. O.F. Parsons. A note on some 18th century dies in the Gloucester City Museum. BNJ 1958-9 v29 pp172-3.
7. http://mpmengineering.co.uk/benson/william_benson.htm
8. Joseph Moxon. *Mechanic Exercises, or, The Doctrine of Handy-works*. 1677, p35. Quoted in Challis *A new history of the Royal Mint*. Cambridge 1992, p347.

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