An 1834 William IV Sixpence with a Laboratory-Confirmed Multi-Strike Mint Error from the Steam Press Era

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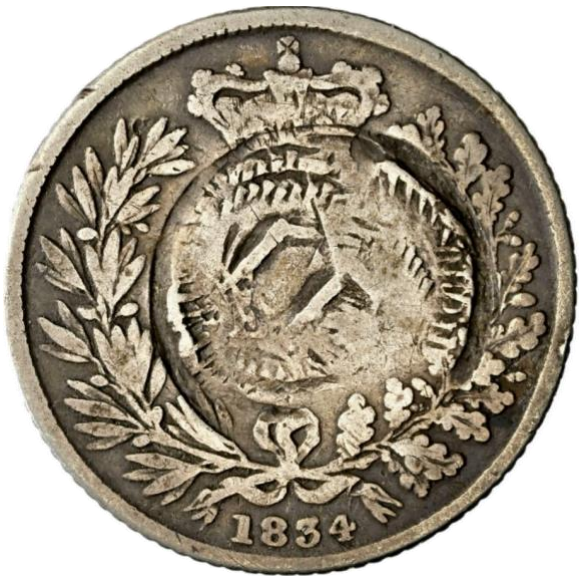

Figure 1. The 1834 William IV Sixpence showing reverse deformation.

Introduction

This research note documents a newly identified striking anomaly on an 1834 William IV sixpence. The specimen exhibits severe deformation across both obverse and reverse surfaces that cannot be attributed to circulation wear, post-mint damage, corrosion, or tooling. Independent laboratory analysis confirms that the deformation occurred during the striking process at the Royal Mint.

Severe mint-stage anomalies in William IV silver coinage are seldom recorded. Set against the backdrop of the Royal Mint's early use of steam-powered coining machinery in the 1830s, this specimen provides rare physical evidence of mechanical failure during the early industrialisation of British coin production.

Obverse: Laboratory Findings

The obverse shows extensive deformation consistent with repeated in-die striking. Optical profilometry of the portrait centre recorded relief variation of approximately 40–790 µm (Sz ≈ 750 µm). Arcuate troughs, terrace-like steps, and raised shoulders were observed, with steep localised slopes. These features are diagnostic of in-die metal displacement under repeated compression and are incompatible with post-mint abrasion or flattening.

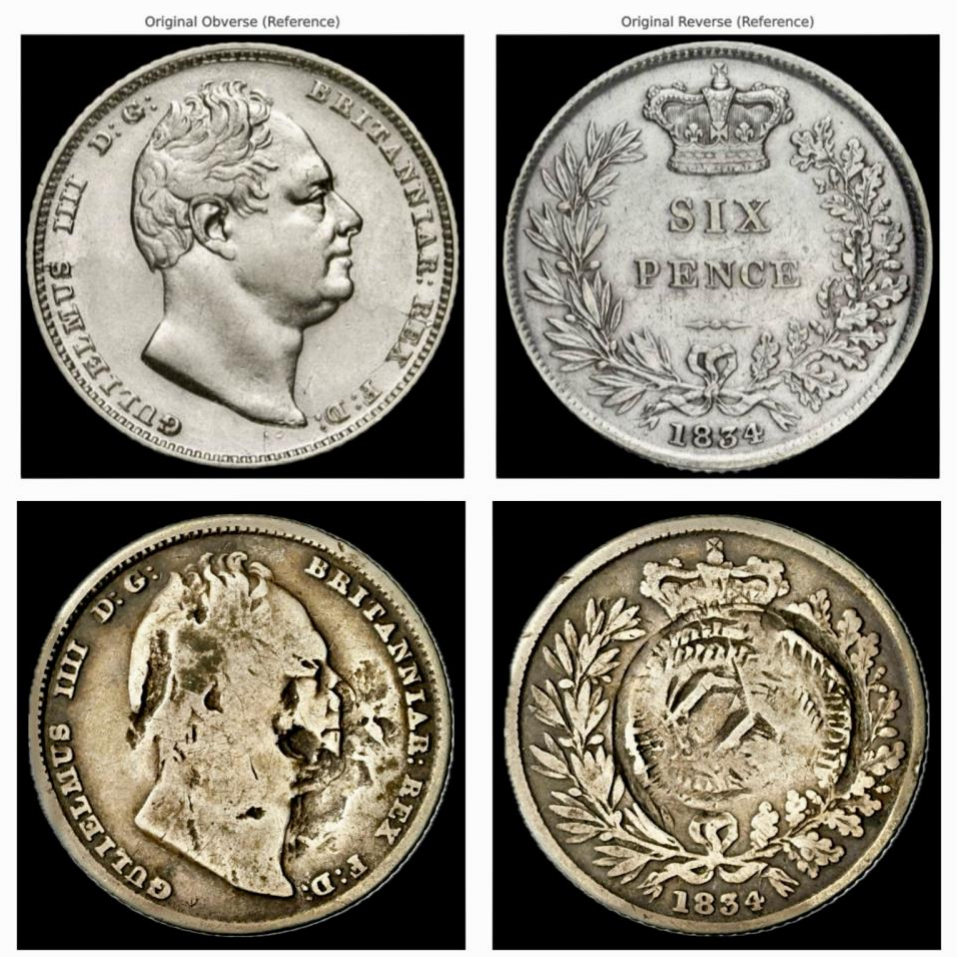

Figure 2. Reference specimens (top) versus the present coin (bottom), showing obverse and reverse anomalies.

Reverse: Laboratory Findings

Profilometry documented severe multi-strike distortion in the denomination zone:

- The word SIXPENCE is almost entirely effaced, with faint traces of “PE” surviving.
- A domed, terraced surface occupies the central field, formed by overlapping strikes.
- A shallow central depression (c. 200 µm) contains a concentric “ghost ring”, marking the obstruction’s outline.
- Radiating metal-flow lines indicate dynamic metal displacement during successive blows.

Together with the preserved natural silver patina, these features confirm a genuine mint-stage origin.

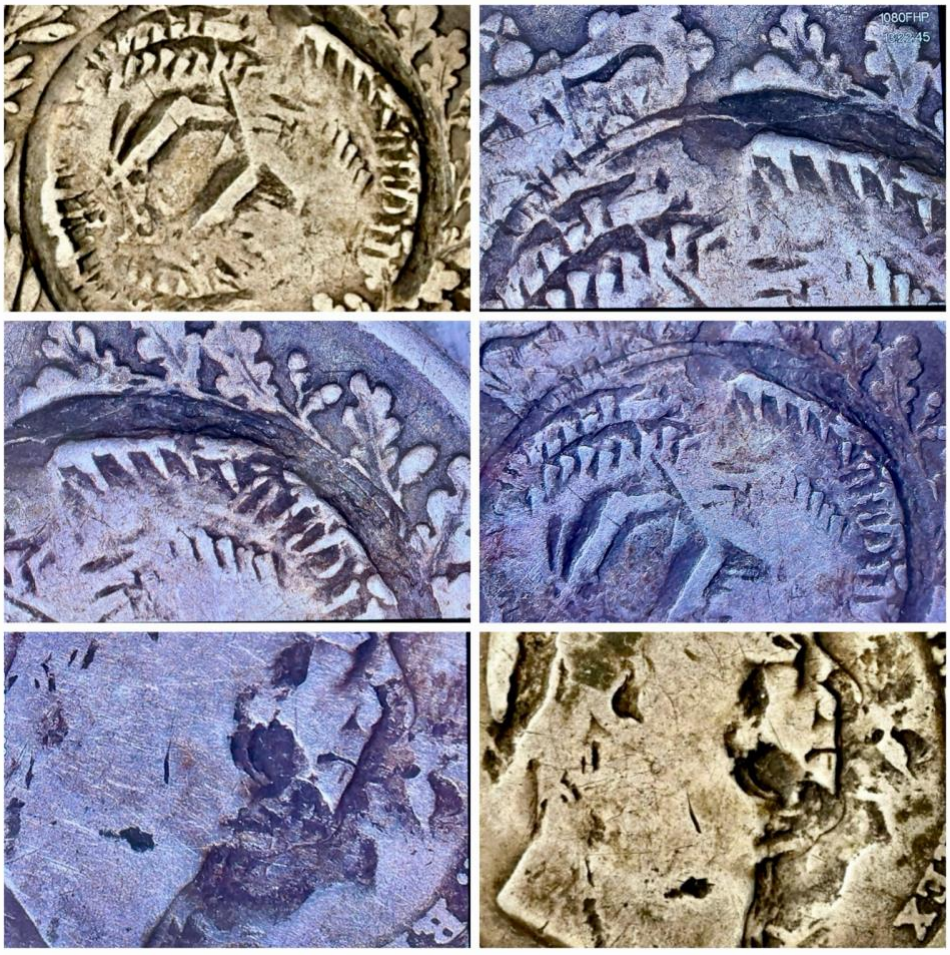

Figure 3. Close-up diagnostic imaging of both obverse and reverse anomalies under varied lighting and magnification.

Rim and Collar

Peripheral rim beads are partly absent in one sector, consistent with collar instability during striking. The edge milling remains intact, demonstrating that the coin remained within the collar during the final blows.

Metallurgical Analysis

SEM–EDX conducted at Brunel University London confirmed a sterling silver alloy of 92.5% Ag with copper balance, consistent with Royal Mint standards of the period. No anomalous contaminants or surface residues were detected. The undisturbed metallurgical integrity supports deformation occurring under minting pressure rather than through later damage or modification.

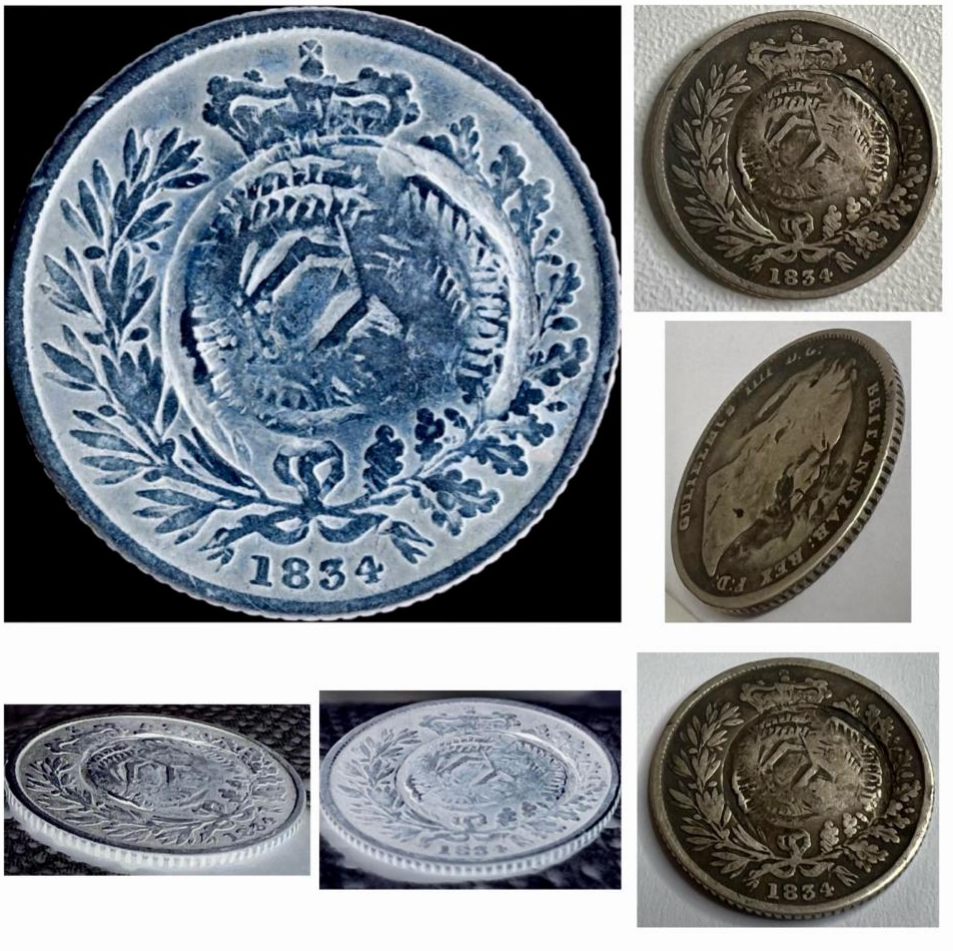

Figure 4. Multi-angle photographic grid under different lighting perspectives.

Methodology

The investigation combined digital and laboratory-based approaches:

1. Exploratory Imaging & Comparative Analysis

Initial imaging and reference checks indicated a striking error and guided the laboratory programme.

2. Laboratory Analysis

• Brunel University London (SEM–EDX): Confirmed composition and excluded artificial tooling or contamination.

• Oxford Materials Characterisation Service (Optical Profilometry): Produced 3-D surface maps showing severe deformation consistent with repeated in-die striking.

3. Interpretive & Archival Review

Comparative checks across available Royal Mint documentation, British Museum catalogues, and major auction archives revealed no equivalent specimen.

While digital imaging assisted the study, final classification is based on laboratory datasets and conventional numismatic evaluation

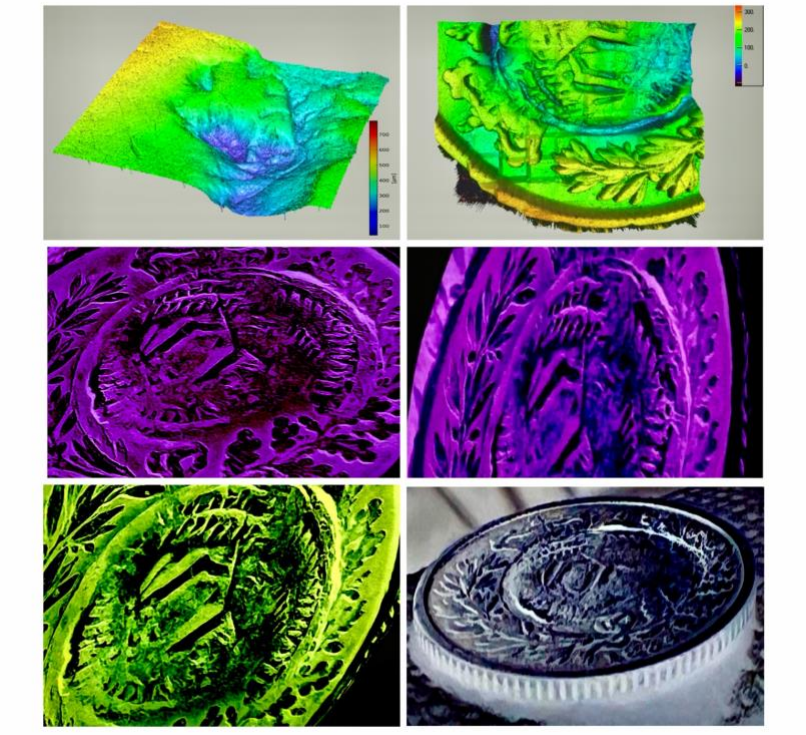

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Figure 5. False-colour profilometry maps showing relief variation & overlapping error strikes

Conclusion

The combined evidence supports classification of this coin as a severe multi-strike mint error, exhibiting characteristics of a retained die cap with elements of a late-stage brockage and strike-through obstruction. To the best of the author's knowledge, no comparable example has been recorded in published numismatic archives to date.

This case highlights the value of integrating laboratory techniques, such as SEM–EDX and high-resolution profilometry, with traditional numismatic study to distinguish genuine mint-stage anomalies from post-mint alteration with high confidence.

Note to Readers

This blogpost provides a concise summary of a longer study. A short methods appendix or selected further material, such as additional profilometry outputs or comparative imaging, can be provided on request.

Acknowledgements

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