

Memorandum by Newton: 'Of the assaying of Gold and Silver, the making of indented Triall-pieces and trying the moneys in the Pix'.

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Source: MINT 19/1/109, National Archives, Kew, Richmond, Surrey, UK

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Of the assaying of Gold and Silver, the making of indented Triall-pieces, and trying the moneys in the Pix.

1 of the Assay

Assaying and refining are operations of the same kind. The assayer refines a small peice of any mass of Gold or Silver, and by the decrease of its weight makes his report, and if there be no decrease, that is, if the mass be of the same fineness with the refined assay-piece, he reports (or ought to report) the Gold 24 carats fine and the silver 12 ounces fine, and this is fine Gold and fine Silver in the Sense of the Law. And all Gold and Silver of the same finenesse with the Assay piece is fine Gold and fine Silver in the sense of the Law. And because the Assayer works more exactly to a rule than the Refiner and makes better dispatch, the Assay is made the standing universall rule of Valuing Gold and Silver in all Nations in point of finenesse, and the Law in ordeining that standard. Gold shall be 22 carats fine and standard silver 11 ounces two penny weight fine, means by the Assay.

The Assay of Gold ought to be made with two waters and noe more this being the constant practice of assaying, and the waters ought to be of the usual strength (the Second Water stronger than the first) and to work the usual time and in the usual heat, and the assay-piece ought to be hammer'd to the usual thinnesse that the Assays may be uniforme, and the Assays of Silver ought to be made with a due proportion of lead in a due and even heat, and as soon as the lead is blown off and the Silver looks bright and glittering, the Silver must begin to cool without roasting it, and it must cool slowly that it doe not spring, But in refining Gold and Silver in great quantities these niceties are not observed.

Assays are lyable to errors, but the errors are generally very small and seldome exceed a quarter of a grain in Gold and an half penny weight in Silver, and by reason of these little errors the Assayer in single Assays makes his report to noe lesse then a quarter of a grain in Gold and an half penny weight in Silver, But if two or more assays be made of the same piece of Gold or of the same piece of Silver, and the assays agree without any considerable difference and a medium be taken between them, the finenesse of the Gold may be determined to lesse then half a quarter of a graine, and the finenesse of the Silver to lesse than an half penny weight, and this is the exactest way of assaying hitherto in use.

2 of making the Indented Trial-pieces

The Standard Trial-pieces are made by the assay. First a Jury of workmen summoned and sworn by Order of Council procures Gold and silver refin'd by the Refiner, and assays them to see if they be of a just degree of fineness, that is, the Gold just 24 carats fine and the Silver just 12 ounces fine, Then they melt this Gold and Silver severally with allay in due proportion and stir them well together in fusion severall times to mix them very well with the Allay, and pour them off before the allay evaporates, and then assay them severall times to see if they be standard, taking assays from severall places to see if the mixture be uniforme, It must agree therefore with the assay as exactly as is possible least there be two standards, one by the Assay-weights, the other by the Trial-pieces.

Refiners find it difficult to refine Gold to the degree of 24 carats. they seldome make it above 23^{car}: 3^{gr}: 3^{qters}: fine, and by fine Gold generally understand gold of this degree of finenesse, and if Gold at any time prove finer upon the assay, Assayers out of prejudice doe not report it finer, and thence it comes to passe that Goldsmiths are generally of opinion that Gold cannot be above 24 carats fine not knowing that there are ways of making it finer then by the assay. Thence alsoe it may have sometimes happened that at the making of tryal-pieces the Assayer may have reported the fine Gold not soe fine as really it was, and by that means the tryal-peice may have been made too fine. And if the fine gold was but 23^{car}: 3^{gr}: 3^{qters}: fine, <109v> The Trial-pieces may have been made too coarse, and there are other ways of erring, as by assaying with waters too strong or too weak or after any other unusuall manner, or by scattering any part of the allay or of the fine Gold or Suffering a sencible part of the Allay to evaporate or not mixing the Gold with the allay very well, or using a faulty crucible, or roasting the fine silver or suffering it to spring in the assay, And for avoiding these errors the Jury ought to consist of workmen very well skilled and exercised in assaying, refining and allaying of Gold and Silver.

3 of trying the Pix

The tryall of the moneys in the Pix is to be performed by a Jury of Assayers in the presence of the warden Master & comptroller of the Mint after the most just manner that can be made by fire, by water by touch or by weight, or by all or by any of them, as is described in the Indenture of the Mint. The Pix is opened, and the Jury sworn before the Queen or such of her Councill as her Majesty shall appoint. If the tryal pieces be exactly made the tryal thereby is the most expedite and the least lyable to errors or fallacy. But a Tryal piece may happen to be erroneous, and then the other ways of assaying, as they are lawfull, soe alsoe they may be usefull, For the assay by the assay weights exactly performed will discover the error of the trial piece if there by any and how great that error is, and the assay by the touch may be also used to see how it agrees with the other assays, tho it be less exact and not to be depended upon alone.

If at any time the Tryal-piece doth not agree with the Assay, either the error must be reported by the Jury or it must not be reported. If it be reported, either the Master of the Mint must be authorized to allow for the error in coining the money by that Trial-piece for the future or a New Tryal-piece must be made. If it must not be reported, the Mint-Master must goe on to coine the money by an erroneous Tryal-piece, and the Goldsmiths will have it in their power to alter the Standard without Controul as often as they are to make a New Tryal-piece and to make a New Standard instead of making a New Trial piece agreeable to the Standard established by Law.

At the last Trial of the Pix the Gold money was Standard full by the Assay and the Trial-piece a quarter of a grain better than the money and the Jury in their Verdict represented the money a quarter of a grain worse than Standard by the Trial piece. This Trial piece was made upon the Union A: C: 1707 It was made (I think) without an Order of Council and by many assays very carefully made is by five twelfths of a grain better than Standard, That of 1688 made by order of King James II is a sixth part of A grain better than Standard, and that of 1660 made by order of King Charles II is Standard.

Quære 1 If upon trying the Pix, the Trial-piece at any time doth not agree with the Assay, are not the Jury to report the Error.

Quære 2 If any doubt arise about the manner of the report or verdict are not the Jury to make a Special report of the matter of fact and leave it to the Queen and Council to make a Judgment thereupon.

Quære 3 If any doubt arise about the truth of the tale, weight, or assay, are not the Iury (Especially at the motion of the Officers of the Mint) to repeat the operation.
