Eight variant holograph drafts of MINT00173 (/catalogue/record/MINT00173) (Mint 19/1/109).

Author: Isaac Newton

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<243r>

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

1. Of the Assay

Assaying & refining are operations of the same kind. The Assayer refines a small piece of any mass of Gold or Silver, & 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 & the silver 12 ounces fine. And this is fine gold & fine silver in the sense of the law. And all gold & silver of the same fineness with the Assay piece is fine gold & fine silver in the sense of the law. And because the Assayer works more exactly to a rule then the Refiner & makes better dispatch, the Assay is made the standing universal Rule of valuing gold & silver in all nations in point of fineness, & the Law in ordeining that standard gold shall be 22 carats fine & standard silver 11 ounces two penny weight fine, means by the Assay.

The assays of gold ought to be made with two waters & no more, this being the constant practise of assaying, & the waters ought to be of the usual strength (the second water stronger then the first) & to work the usual time & in the usual heat, & the Assay piece ought to be hammered to the usuall thinness that the Assays may be uniform. And the Assays of silver ought to be made with a due proportion of Lead in a due & eaven heat, & as soon as the lead is blown off & the silver looks bright & glittering, the silver must begin to cool without roasting it, & it must cool slowly that it do not spring. But in refining gold & silver in great quantities these niceties are not observed

Assays are liable to errors, but the errors are generally very small & seldome exceed a quarter of a grain in gold & an halfpenny weight in silver. And by reason of these little errors the Assayer in single Assays makes his report to no less then a quarter of a grain in gold & 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, & the assays agree without any considerable difference & a medium be taken between them, the fineness of the Gold may be determined to less then half a quarter of a grain & the fineness of the silver to less 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 Iury of workmen summoned & sworn by Order of Council procures gold & silver refined by the Refiner, & assays them to see if they be of a just degree of fineness, that is, the gold just 24 carats fine & the silver just 12 ounces fine. Then they melt this gold & silver severally with allay in due proportion & stir them well together in fusion several times to mix them very well with the Allay, & pour them off before the Allay evaporates, & then assay them several times to see if they be standard, taking assays from several places to see if the mixture be uniform. 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-piece

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, & by fine gold generally understand gold of this **{**degree**}** of fineness. And if gold at any time prove finer upon **{**the Assay**}** **{**Assayers**}** out of prejudice do not report it finer. And thence it **{**comes to pass 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 also it may have sometimes happened that at **{**the making of new**}** Trial pieces the Assayer may have reported the fine gold **{**not so fine as**}** it was, & by that means the Trial piece may have been **{**made too fine. And if**}** the fine gold was by $23^{car.}\ 3^{gr.}\ 3^{qters}$ fine, the Trial-piece <243v> 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 sensible 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 avoyding these errors the Iury ought to consist of workmen very well skilled & exercised in assaying refining & allaying of gold & silver.

3 Of trying the Pix.

The trial of the moneys in the Pix is to be performed by a Iury 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 & the Iury sworn before the Queen or such of her Council as her Majesty shall appoint. If the triall pieces be exactly made the trial thereby is the most expedite & the least liable to errors or fallacy. But a Trial piece may happen to be erroneous, & then the other ways of assaying, as they are lawfull so also they may be usefull. For the assay by the assay weights exactly performed will discover the error of the Trial piece if there be any & how great that error is, & the assay by the Touch may be also used to see how it agrees with the other assays, tho it be less exact & not to be depended upon alone.

If at any time the Trial piece doth not agree with the Assay, either the error must be reported by the Iury 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 Trial piece must be made. If it must not be reported, the Mint Master must go on to coin the money by an erroneous trial piece, & the Goldsmiths will have it in their power to alter the standard without controll as often as they are to make a new Trial-piece, & to make a new standard instead of making a new Trial piece agreable to the standard established by law.

At the last trial of the Pix the gold money was standard full by the Assay, & the Trial piece a quarter of a grain better then the money & the Iury in their Veredict represented the money a quarter of a grain worse then standard by the Trial piece. This Trial piece was made upon the Vnion A. C. 1707. It was made (I think) without an Order of Council, & by my assays very carefully made is five twelfts of a grain better then standard, that of 1688 made by order of King Iames II is a sixt part of a grain better then standard & that of 1660 made by order of King Charles II is standard.

Quære 1. If upon trying the Pix, the Trial-piece at any t**{**i**}**me doth not agree with the Assay, are not the Iury to report the error?

Quære 2. If any doubt arise about the manner of the R**{**ep**}**ort or Veredict are not the Iury to make a special Report of the matter of fact & **{**lea**}**ve it to the Queen & council to make a judgment thereupon?

Quære 3. If any doubt arise about the truth of the tale, w**{**e**}**ight or assay, ar**{**e**}** not the Iury especially at the motion of the Officers of the Mint to repeat the operati**{**on?**}**

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Of the assaying of Gold & Silver, the making indented Tryal pieces, & trying the moneys in the Pix.

1 Of the assay.

1 Assaying & refining are operations of the same kind. The Assayer refines a small piece of any mass of gold or silver, & 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) it two carats better then standard or twenty & four carats fine if it be gold, or twelve ounces fine if it be silver. And this is fine gold or fine silver in the sense of the law. And all gold & silver in the sense of the law is fine gold & fine silver if it be of the same fineness with the Assay-piece And because the Assayer works more exactly to a rule then the Refiner & makes better dispatch, the Assay is made the standing universal Rule of valuing gold & silver in all nations in point of fineness, & the law in ordeining that standard Gold shall be 22 carats fine & standard silver 11 ounces two penny weight fine, means by the assay.

2. The assays of Gold ought to be made with two waters & no more, this being the constant practise of assaying, & the waters ought to be of the usual strength (the second water stronger then the first,) & to work the usual time, & in the usual heat, & the Assay-piece ought to be hammered to the usual thinness that the Assays may be uniform. And the assays of silver ought to be made with a due proportion of Lead in a due & eaven heat, & as soon as the Lead is blown off & the silver looks bright & glittering, the silver must begin to cool without roasting it, & it must cool slowly it do not spring. But in refining gold & silver in great quantities these niceties are not observed.

5 Refiners find it difficult to refine gold to the degree of 24 carats. They seldome make it above 23 carats 3 grains & 3 quarters of a grain fine, & by fine gold generally understand gold of this degree of fineness. And if gold at any time prove finer upon the Assay, Assayers out of prejudice do not report it finer. And thence it comes to pass 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. † < insertion from the top of f 245r > † Thence also it may have sometimes happened that at the making of new Trial pieces, the Assayer may have reported the fine gold not so fine as it really was, & by that means the Trial piece may have been made too fine. And if the fine gold was but $23^{car}\ 3^{gr}\ 3^{qters}$ fine, the Trial piece may have been made too coarse. And there are other ways of erring, as by assaying after any unusual manner, or by scattering any part of the allay or of the gold or suffering a sensible quantity of the allay to evaporate, or not mixing the allay with the gold very well.

< text from f 244r resumes >

3. Assays are liable to errors, but the errors are generally very small & seldome exceed a quarter of a grain in gold or an halfpenny eight in silver. And by reason of these little errors the Assayer in single assays makes his reports to no less parts then a quarter of a grain in gold & 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, & the assays agree without any considerable difference & a medium be taken between them: the fineness of the gold may be determined to less then half a quarter of a grain, & the fineness of the silver to less then half an half penny weight. And this is the exactest way of assaying hitherto in use

2 Of making the Trial pieces.

4. The standard Trial pieces are made by the assay. First the Iury procures gold & silver refined by the Refiner & assays then to see if they be of a just degree of fineness, that is, the gold just 24 carats fine & the silver just 12 ounces fine. Then they melt this gold & silver severally with allay in due proportion, & stir them well together in fusion several times to mix them very well, & pour them off before the allay evaporates, & then assay them several times to see if they be standard, taking assays from several places to see if the mixture be uniform? They must agree there <244v> fore with the assay as exactly as is possible least there be two standards, one by the Assay-weights the other by the Trial-pieces.

2 Of trying the Pix.

6. The trial of the moneys in the Pix is to be performed 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 exprest in the Indenture of the Mint. If the Trial piece be exactly made, the trial thereby is the most expedite & the least liable to errors. But a trial piece may happen to be erroneous, & then the other ways of assaying, as they are lawfull, so also they may be usefull. For the assay by the Assay-weights exactly made will discover the error of the Trial piece if there be any, & how great that error is; & the Assay by the touch ebing very easy may be also used to see how it agrees with the other assays, but it is less exact & not to be depended upon alone.

7. If at any time the Trial-piece doth not agree with the assay either the error must be reported by the Iury or it must not be reported. If it be reported, either the Master of the Mint must be authorised to allow for the error in coining the money by that Triall piece for the future, or a new Trial-piece must be made. If it must not be reported, the Master must go on to coin the money by an erroneous Trial piece, & the Goldsmiths must have it in their power to alter the standard without controll as often as they are to make a new Trial piece & to make a new standard instead of making a new Trial piece agreable to the standard established by law.

Quære 1. If upon trying the Pix the Trial-piece at any time doth not agree with the Assay, whether are not the Iury to report the error?

Quære 2. If any other doubt arise, whether are not the Iury to make a special Report of the matter of fact, & leave it to the Queen & Council to make a judgment thereupon?

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When new moneys are coined two pieces are taken out of every 15 pound weight of gold moneys & two out of every 60 pound weight of silver moneys, one for the assay before delivery of the moneys the other for the assay after delivery. The first are assayed presently in the Mint by the Queens Assaymaster in in the presence of the Warden Master & Comptroller, the later are put into a Pix or Box to be opened upon reasonable warning before the Queen or such of her Council as her Majesty shall think fit & tried by a Iury of sworn Assayers in the presence of the Warden Master & Controller. But trials are of the same kind with

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

1 Of the Assay.

Assaying & refining are operations of the same kind. The Assayer refines a small piece of any mass of Gold or Silver, & 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 & the silver 12 ounces fine. And this is fine gold & fine silver in the sense of the law. And all gold & silver is fine gold & fine silver in the sense of the law if it be of the same fineness with the Assay piece. And because the Assayer works more exactly to a rule then the Refiner & makes better dispatch, the Assay is made the standing universal rule of valuing gold & silver in all nations in point of fineness, & the Law in ordeining that standard gold shall be 22 carats fine & standard silver 11 ounces two penny weight fine, means by the Assay.

The assays of gold ought to be made with two waters & no more, this being the constant practise of assaying; & the waters ought to be of the usuall strength (the second water stronger then the first) & to work the usual time & in the usual heat, & the Assay-piece ought to be hammered to the usual thinness that the Assays may be uniform. And the Assays of silver ought to be made with a due proportion of Lead in a due & eaven heat; & as soon as the Lead is blown off & the silver looks bright & glittering, the silver must begin to cool without roasting it, & it must cool slowly that it do not spring. But in refining gold & silver in great quantities, these niceties are not observed.

Assays are liable to errors, but the errors are generally very small & seldome exceed a quarter of a grain in gold or an half penny weight in silver. And by reason of these little errors the Assayer in single Assays makes his report to no less then a quarter of a grain in gold & 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, & the Assays agree without any considerable difference & a medium be taken between them, the fineness of the Gold may be determined to less then half a quarter of a grain & the fineness of the silver to less then half an half penny weight. And this is the exactest way of assaying hitherto in use

2. Of making the Indented Trial-pieces.

The standard Triall-pieces are made by the Assay. First a Iury of workmen summoned & sworn by order of Council procures gold & silver refined by the Refiner & Assays them to see if they be of a just degree of fineness, that is, the gold just 24 carats fine & the silver just 12 ounces fine. Then they melt this gold & silver severally with allay in due proportion & stir them well together in fusion several times to mix them very well with the allay, & pour them off before the Allay evaporates, & then assay them several times to see if they be standard, taking assays from several places to see if the mixture be uniform. 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-piece.

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, & by fine gold generally understand gold of this degree of fineness. And if gold at any time prove finer upon the assay, Assayers out of prejudice do not report it finer. And thence it comes to pass 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 also it may have sometimes happened that at the making of new Trial pieces the Assayer may have reported the fine gold not so fine as it really was <247> and by that means the Trial piece may have been made too fine. And if the fine gold was by $23^{car.}\ 3^{gr.}\ 3^{qters}$ fine, the Trial-piece may have been made too coarse. And there are other ways of erring as by assaying after any unusual manner, or by scattering any part of the allay or of the gold or suffering a sensible part of the Allay to evaporate, or not mixing the gold with the Allay very well, or using a faulty crucible. And for avoiding these errors the Iury ought to consist of workmen very well skilled in assaying of gold & silver.

3 Of trying the Pix.

The trial of the moneys in the Pix is to be performed by a Iury 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 expressed in the Indenture of the Mint. The Pix is opened & the Iury sworn before her Majesty or such of her Council as her Majesty shall appoint. If the Triall pieces be exactly made the triall thereby is the most expedite & the least liable to errors or fallacy. But a Trial-piece may happen to be erroneous & then the other ways of assaying, as they are lawfull, so also they may be usefull. For the assay by the Assay-weights exactly performed will discover the error of the Triall piece if there be any, & how great that error is, & the assay by the Touch may be also used to see how it agrees with the other assays, tho it be less exact & not to be depended upon alone.

If at any time the Trial-piece doth not agree with the Assay, either the error must be reported by the Iury 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 Trial piece must be made. If it must not be reported the Mint master must go on to coin the money by an erroneous Trial piece, & the Goldsmiths will have it in their power to alter the standard without controll as often as they are to make a new Trial piece, & 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, & the Trial-piece a quarter of a grain better then the money, & the Iury in their Veredict represented the money a quarter of a grain wors then standard by the Trial piece. This Trial piece was made upon the Vnion A. C. 1707. It was made (I think) without an order of Council, & by my Assays very carefully made, is five twelfts of a grain better then standard; that of 1688 made by order of King Iames II is a sixt part of a grain better then standard, & that of

1660 made by Order of King Charles II is standard.

Quære 1. If upon trying the Pix, the Triall-piece at any time doth not agree with the Assay, Whether are not the Iury to report the error?

Quære 2. If any doubt arise about the manner of the Report or Veredict, whether are not the Iury to make a special Report of the matter of fact & leave it to the Queen & Council to make a judgment thereupon?

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

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For avoyding these errors the jury ought to consist of workmen very well skilled & exercised in refining assayi**{**ng**}** & allaying of gold & silver, & not to abound with shopkeepers, wiredrawers, Gilder & other persons not well skilled in the manual arts requisite to make the Trial pieces.

If any doubt arise about the goodness of the first assay, are not the Iury (at the motion of the Officers of the Mint) to repeat the assay.

Assaying & Refining are operations of the same kind. The Assayer refines a small piece of any mass of gold or silver & by the decrease of weight makes his report; & if there be no decrease, that is, if the mass be of the same fineness with the Assay piece, he reports it two carats better then standard, or twenty & four carats fine, & this is fine gold in the sense of the law. The Assay piece therefore, when the Assayer works exactly, becomes fine gold or fine silver in the sense of the law. And because the Assayer works more exactly to a rule then the Refiner, & makes better dispatch, the Assay is made the standing universal rule of valuing gold & silver in point of fineness, & the Law in ordeining that standard Gold shall be 22 carats fine & standard silver eleven ounces two penny weight fine, means by the assay.

The standard Trial pieces are made by the Assay. First the Iury procures gold & silver refined by the Refiner, & then assays the same to see if they be of a just degree of fineness, that is, the gold just two carats better then standard & the silver just 18 penny weight better. And when the Trial pieces are made, the Iury assays them several times to see if they be standard.

The assays of gold ought to be made with two waters & no more this being the constant practise of assaying, & the waters ought to be of the usual strength & to work the usual time & in the usual heat, & the Assay piece ought to be hammered to the usual thinness that the assays may be uniform.

Refiners find it difficult to refine gold to the degree of 24 carats. They seldome make it above 23 carats 3 grains & three quarters of a grain fine And by fine gold understand gold of this degree of fineness And thence it comes to pass that the Goldsmiths are generally of opinion that gold cannot be above 24 carats fine. But if when they have watered their granulated Gold once or twice with Aqua fortis, they should dulcify it & grind it very fine as painters do their colours & then water it once or twice more with double Aqua fortis in the same degree of heat as before, & keep it longer in the water then before, stirring it now & then with a wooden stick to make the gold mix with fresh water the Gold will become finer then by the Assay, & by consequence finer then four & twenty carats. Chymists also tell us that Gold may be made finer by Antimony then by Aqua fortis, & by consequence then by the Assay; but the Goldsmiths know not how to refine Gold by Antimony.

If Refiners should work perfectly in the same manner with Assayers, that is, if they should mix gold with silver in the same proportion & drive it off the Test with the same proportion of lead & hammer it to the very same thinness & water it with waters of the same strength in the same degree of heat during the same length of time, their gold would become just 24 carats fine. But they work not with so much curiosity & eaveness.

The tryal of the moneys in the Pix is to be performed after the most just manner that can be made by fire by water by <248v> touch or by weight or by all or by any of them. If the Trial pieces be made exactly the trial

thereby is the most expedite & the least liable to errors. But a Trial piece may happen to be erronus, & then other ways of Assaying may be also usefull. For the assay by the Assay weights exactly made will discover the error of the tryal piece, if there be any & how great that error is.

At the last trial of the Pix the Iury by the Assay found the money standard & the Trial piece a quarter of a grain better then the money & reported in their Veredict that the money was a quarter of a grain wors then standard by the Trial piece. The Report or Veredict imported that < insertion from f 248r > the Trial piece was standard & < text from f 248v resumes > the money be worse then standard , tho the Iury by the Assay found the money standard full & the trial piece a quarter of a grain better then standard.

When I came first to the Mint & for some years before, the Importers were allowed the advantage of almost all the remedy, & then the Gold imported made about four pounds & two pence per ounce standard. The Goldsmiths now complain that their Gold doth not make 4^{li} per ounce. It should make only three pounds nineteen shillings & eight pence three farthings, & so much it hath made ever since the last triall of the Pix.

While the Importers were allowed the advantage of almost all the Remedy, there wanted about 30 grains of fine gold in four & forty Guineas & an half, & as much or more fine silver in sixty & two shillings. There is now the just quantity of gold & silver in the moneys & there wants only about the third part of a grain of copppy in a Guinea which want is of no value or consequence being less then the thousandth part of a penny in a Guinea & is occasioned by the want of so much allay in the gold Trial piece:

They must agree therefore with the Assay as exactly as is possible least there be two standards. And therefore whenever the assay of the money by the Assay weights differs from that by the Triall piece, the difference ought to be reported

The Assays of Silver ought to be made with a due proportion of lead in a due & eaven heat & as soon as the lead is block off the silver must begin to cool without roasting it, & it must cool slowly that it do not spring. Then the Assay piece becomes 12 ounces fine: And if after the lead is blown off, fresh lead be added two or three times & the assay piece be well roasted after all the lead is blown off, the silver will become still finer but not a half penny weight < insertion from f 248r > finer then 12 ounces < text from f 248v resumes > . In refining Gold & silver in great quantities, the niceties above described in making assays, are not observed, & therefore the Refiners fine Gold & fine silver must be assayed to know how fine they are.

And if the Refiner in refining silver should in all circumstances observe the Assayers rules & proportions, his silver would become 12 ounces fine. But Refiners work not with so much curiosity & eavenness. Their fine gold & fine silver must be assayed to know the just degree of fineness.

The Trial piece is made by melting 11 ounces of fine gold with one ounce of copper allay & 11 ounces 2^{dw^t} of fine silver with 18 penny weight of copper allay & keeping the mixture in fusion 20 or 30 minutes & in the mean time stirring it severall times to mix the metalls very well & then pouring it off

And assay taken from them in several places must agree with one another to see if the fine gold & fine silver be eavenly mixed with the allay.

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This Trial piece was made in the year 1707.

The Trial piece of 1660 agrees with the Assay, that of 1688 is (by my assays) the sixth part of a grain better then standard & that of 1707 five twelft parts of a grain better. That of 1688 is established upon the present Indenture of the Mint; that of 1707 is not yet established nor can I find that it was made by the Queens Order as it ought to have been. In the entry books of the Treasury I meet with no mention of any such Order When the next Trial pieces are made the goldsmiths ought to give a Receipt of the pieces delivered to them for making their plate. For tho the Gold plate be 23 carats fine & the Trial piece but 22 carats fine yet they may make their gold plate by the gold Trial piece by putting into the Assay scales a weight answering to the difference.

Are not the Iury to survey the fabrication of the moneys & make a special report of the matter of fact where my judicial doubt arises & leave it to the Queen & Council to make a judgment thereupon without {presuming} to prevent them by interposing their own judgments

By my assays the Trial piece of 1660 is standard without any error of moment, that of 1688 is the sixt part of a grain better then standard, that of 1707 five twelft parts of a grain better then standard. The Iury also at the last trial of the Pix finding this last Trial piece a quarter of a grain better then standard full & therefore it is not a standard Triall piece.

Quære whether if a Iury find how much the error is of any Trial piece the Master of the Mint may not be an Order of Council allow for the error in coyning the money by that Trial piece.

If upon any trial of the Pix the triall piece prove not standard, whether are not the Iury to ascertain the error & report it? And whether may not the Master of the Mint by an Order of Council allow for that error in coining the money by that Trial piece for the future

There he melts the gold & silver with allay in a just proportion, stirs them well together in fusion several times to mix them well & pours them off before the allay evaporate.

If at any time the Trial piece doth not agree with the assays either the error must be reported by the Iury 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 Trial piece must be made. If it must not be reported, the Master must go on to coin the money by an erroneus Trial piece & the goldsmiths must have it in their power to alter the standard without controll as often as they are to make a new Trial piece.

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When a jury is to make a new standard trial piece they are not to make a new standard but a new Triall piece agreable to the standa{rd} established by Law. They may err in making a new Trial piece but it is not in their power to alter the standard. And if they err & the error amount to a quarter of a grain in gold or an half-penny weight in silver, the Trial piece is not standard & by consequence not a standard trial piece.

The standard Trial pieces are made by the Assay & will always agree with the assay if they be rightly made. Assays are liable to little error, but if consistent number of assays of the Trial piece agree with one another without any material difference & at a medium are standard, the Trial piece is standard. And the more assays of it are made which agree with one another without any errors of moment & at a medium are standard, the more surely th{e} trial piece is standard. First the Iury – – – just 18 penny weight better. Then the Iury melts the fine gold or fine silver with a just proportion of allay & stirrs them well together several times to mix them very well & then poures them of without keeping them longer on the fire then is necessary to mix them very well, & assays them again several times to see if they be standard. They must agree with the assay as exactly as is possible least there be two standards one by the Assay, another by the Trial piece. An error of half a quarter of a grain in that gold Trial piece or of half a halfpenny weight in the silver trial piece is sensible by the assay & should not be committed.

The assays of Gold &c – – uniform.

Refiners find it – –

If Refiners – – – made fine by the Assay.

The surest way to make gold just 24 carats fine is to refine grai{n} gold once with Antimony, then mixt it with fine silver is such a proportion as by experience shall be found to bring it to the degree of 24 carats fine. This proportion being once found is foun{d} for ever.

Assays are liable to errors, but the errors are generally very small, & seldome exceed a quarter of a grain in gold or an half penny weight in silver. And if two or more Assays of the same piece of gold or silver agree with one another without any considerable difference, the Report is to be made by taking a medium. By which means the fineness of any piece of Gold may be always determined to less then half a quarter of a

grain & the fineness of any piece of silver to less then half a half penny weight And that is the exactest way of valuing gold & silv{er} in point of fineness hitherto in use.

And by reason of these little errors, the Assayer in single assay make his reports to no less parts then a quarter of a grain in gold & a halfpenny weight in silver. But if two or more Assays be made of the same piece of gold or of the same piece of silver, & the assays agree without any considerable difference & a medium be taken between them, the finess of the gold may be determined to less then half a quarter of a grain in gold & half a halfpenny weight in silver, & even to less the{n} half that quantity by a competent number of Assays made by a hand skilfull Assayer. And this is the exactest way of valuing gold & silver in point of fineness hitherto in use amongst Assayers.

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7. When I came first to the Mint & for many years before, Importers were allowed almost all the Remedy, & the money was coyned unequally some pieces being two or three grains too heavy & others as much too light, & the heavy Guines were called Come-again-Guineas because they were culled out & brought back to the Mint to be recoined (as was the common opinion) & thereby the public Moneys called the Coynage Duty were squandred away to the profit of the Master & Moneyers & Goldsmiths & the new moneys which remained after the heavy pieces were culled out, & was put away by the Goldsmiths among the people, was without the Remedy. The money is now coined equally so that the culling trade is at an end. And the Importers are not allowed the advantage of the Remedy, but the money is coined to the just value.

8. When the Importers were allowed the advantage of almost all the Remedy, the Gold imported made about four pounds & two pence per ounce. The Goldsmiths now complain that their Gold doth not make 4^{li} per ounce. It should make only 3^{li} 19^{s} $8^{d}\frac{3}{4}$ by the Law, & so much it hath made ever since the last trial of the Pix.

9. While the Importers were allowed the advantage of the Remedy there wanted about 30 grains of fine gold in $44\frac{1}{2}$ Guineas & about 34 grain{s} of fine silver sixty two shillings. There is not the just quantity of gold & silver in the moneys, & there wants only about 15 grains of fine copper in $44\frac{1}{2}$ Guineas, or the third part of a grain of Copper in a Guinea which want is if no value or consequence & is occasioned by the too great fineness of the trial pieces.

10. The end of the Indenture of the Mint & of all the Rules of coynage is that the moneys for the sake of commerce have its just intrinsic value And if the Iury pleases to examin the moneys in the Pix by the weight & assay together they will find that they are as justly coined to this value as every they were.

11 The moneys cnnot be coined by the Trial piece withut knowing the fineness of the By my Assays the Trial piece of 1688 is a sixt part of a carat better then standard & the Trial piece of 1707 is five 12^{th} parts of a carat better, or thereabouts. At the last trial of the Pix the gold moneys were found standard by the assay & a quarter of a grain wors then standard by the trial piece {o}f 1707 & the Iury reported only the latter. If the moneys be tried again by the same trial piece I humbly pray that both the moneys & the trial piece may be tried also by the Assay & the event reported by the Iury. For the Indenture of hte Mint doth not restrain the trial to the trial piece alone, & a trial by an erroneous trial piece is no fair trial without allowing for the error of the piece, nor is it for the advantage of commerce to admit of such a trial.

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1 Assaying & Refining have the **{illeg}** same foundation. The Assayer refines a small piece of the mass, & by the decrease of weight **{illeg}** Reports & if there be no decrease, that is, if the mass be of the same fineness with the Assay-piece, he reports it 2 carats better then standard, or 24 carats fine & is the fine Gold in the sence of the law. And because the Assayer works more exactly to a rule then the Refiner, the

The Assay is made the standing universal rule of valuing Gold & silver in point of fineness, & the Law in ordeining that standard Gold shall be 22 carats fine & standard silver 11 ounces $two^{dw^{t}}$ fine, means by the Assay.

2 The standard Trial pieces are made by the Assay. First the Iury {procures} fine gold & fine silver & then assays them to see if they be of a just degree of fineness, that is, the gold just two carats better then standard & the silver 1^{wt} 18^{dwt} better. And when the Trial piece is made the Iury assay it again several times to see if it be standard.

3 The assays of gold ought to be made with two waters & no more this being the constant practise of assaying & the waters ought to be of the usual strength, & to work the usual time & in the usual heat, & the Assay piece ought to be hammered to the usual thinness that the Assays may be uniform.

6 The trial of the moneys in the Pix is to be performed after the most just manner that can be thought of to be made by fire by water by touch or by weight or by all or by any of them: If the tryal piece be made exactly, the tryal thereby is the most expedite & least liable to errors. But a trial piece may happen to be erroneus & then other ways of Assaying may be also usefull For the assay by the Assay weights will discover the error of the tryall piece if there by any & how great that error is, & therefore whenever the Trial-piece agrees not with the Assay, the Report should not be made by the Trial piece alone.

4 Refiners find it difficult to refine Gold to the degree of 24 carats. They seldome make it above 23 carats 3^{gr} $\frac{3}{4}$ fine. And thence it comes to pass that the Goldsmiths are generally of opinion that Gold cannot be made above 24 carats fine. But if when they have watered their granulated gold once or twice with Aqua fortis they should dulcify it & grind it very fine as painters do their colours & then water it once or twice more with double Aqua fortis in the same degree of heat as before & keep it longer in the water then before stirring it now & then with a wooden stick to make the gold mix with fresh water: the gold will become finer then by the Assay & by consequence finer then 24 carats. Chymists also tell us that gold may be made finer by Antimony then by Aqua fortis & by consequence then by the Assay; but the Goldsmiths know not how to refine Gold by Antimony.

5 If Refiners should work perfectly in the same manner with Assayers, that is, if they should mix Gold with silver in the same proportion & drive it off the test with the same proportion of Lead & hammer it to the very same thinness & water it with two waters of the same strength in the same heat during the same length of times, their gold would become just 24 carats fine. But they do not use to be at all this pains & charge & scupulputy in their common practise of Refining.

Money being the rule of commerse ought to be coyned of a just intrinsic value This value is known by weight & fineness together. A pound weight of standard gold is to be cut into $44\frac{1}{2}$ Guineas &

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Queres upon the proceedings of the Iury in trying the Pix.

1. The Iury being to try the monies in the Pix by the rules set down in the Indenture of the Mint Quære whether they should not first read so much of the Indenture as relates to the trial, so that they may have all those rules fresh in memory.

2 That Iury being to try the said moneys in the presence of the Officers of the Mint, Quere whether they are not to suffer the said Officers to see the whole triall from the beginning to the end, & for that reason whether they are to go on with more then one operation at once.

3 The Iury being to try the said moneys after the most just manner as can be thought of to be made by fire by water by touch or by weight or by all or by any of them, & to use the standards in her Majestys Exchequer: Quere whether if any doubt shall arise about the triall by the Indented Trial pieces they are not to satisfy themselves about the doubt by any other way of triall & particularly by the single Assay, that Assay being the Rule by which the Trial piece is made & examined by the Iury who makes it. And if any difference appear between the single Assay & the Assay by the Trial piece, whether the Iury are not to report the difference.

4. Quere whether The Iury are not to make their Assays in the manner commonly in use without varying in the heat or government of the fire, or in the strength or quantity of the water or in the number of waters,

poured on the Assay-pieces or in the thinness to which the Assay pieces are hammered, or in the quantity or quality of the Lead, or in any other circumstance which may influence the Assay.

Observations upon the proceeding of the Iury in making Tryal pieces.

1. If the Trial pieces are too fine they occasion a discouragement to the merchant & others which import gold & silver as answers to the excess of fineness, & therefore the triall pieces should rather err in defect of fineness then in excess, & forreign nations chuse rather to err in defect.

2. By fine gold & fine silver is to be understood such gold as is 24 carats fine by the Assay, & such silver as is 12 ounces fine by the Assay. And by standard gold & silver is to be understood such gold as is 22 carats fine by the Assay & such silver as is $11^{oz}\ 2^{dwt}$ fine by the Assay. And in judging of the fineness of the gold or silver there ought to be several Assays made as well successively as at once to see if the errors of the Assays which happen in excess be equal to the errors which happen in deffect. For such errors will happen, & a medium between them is to be taken.

3. If the fine gold or silver be not fully fine by the assay, it may be roasted to make it finer & if the Refiner hath made it too fine, it may be allayed to make it coarser, to the end that the standard by the Trial pieces may be the same with the standard by the Assay. For otherwise there will be two standards, one by the Assay & another by the Trial piece. The French & Spaniards seem to take such fine gold as is commonly made by the Refiners Art without roasting it. For their moneys are a little coarser then the just standard. Its safer to err a little in coarsness then in fineness because the metal will refine a lttle in the fire in melting the gold & allay together

4. To every eleven ounces of fine gold must be added one ounce of fine copper & to every eleven ounces two penny weight of fine silver must be added 18 penny weight of fine copper, & when the gold or silver is well melted the copper must be put into the pot & soon as that is also melted, the metalls much be nimbly stirred together once & again to mixt them well & when they have stood in little on the fire to mix them sufficiently they must be poured to let without letting them stay longer on the fire then is necessary to mix them well least the allay should evaporate in too great a quantity.

5 After the metal is poured off it must be assayed again severall times, & if the Iury think fit they may cause it to be assayed by several hands for their greater satisfaction And for greater security & satisfaction to her Majesty & people they may cause it to be assayed also by **{**t**}**

Quære whether fine gold in the sense of the law be not such gold as is made fine by the Refiners art exercised in the same manner & with the same skill & diligence in refining a great quantity of gold, as in refining a small quantity by the Assay. And by consequence whether fine gold be not such gold as is 24 carats fine by the Assay, & as is skilfully refined without roasting the gold or using more then two waters

gold is gold refined by the Refiners art after the very same manner in a great quantity that it is refined by the Assayers Art in a small quantity; the gold being mixed with silver in the same proportion in both cases & laminated to the same **{**thick**}**nes in both cases & watered & with the same heat & length of operation in both cases, that it may become of the same degree of fineness in both cases, & by consequence 24 carats fine. If the Refiner make the gold thinner or use stronger water or pour upon the gold oftener them the Assayer doth he will make gold finer then the Assayer doth that is finer then 24 carats And if he refine it by ♁ it will become still finer. But if the Refiner makes the gold not so then as the Assayer doth or pour on water but once or use weaker water or a less quantity, thereof, the gold will not become so fine as by the Assay that is not fully 24 carats fine. And because the Refiner uses not to be of the paying & charges of making his gold so fine as in great quantity as it is made by the Assayer in small quantity thence it comes to pass that gold 24 carats fine is scarce to be met with & that the Iury who makes the tryal piece roasts the Refiners gold to make it 24 carats fine by the Assay. And when the fine gold is mixed with Allay in due proportion to make the Trial piece, the Iury assay it again several times to see if it be standard. The Assay therefore is the fundamental as well as the universal rule of valuing gold & silver in point of fineness, And because Assayers by constant

practise are better skilled in refining gold to a certain degree by the Assay then Refiners are in refining it to a certain degree by the Art of Refining, therefore the Refiners Art is not trusted alone in making fine gold, but the gold is examined by the Assay before it be adjudged to be exactly 24 carats fine.

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Of the assaying of Gold & silver, the making of indented Triall pieces, & trying the moneys in the Pix.

1 Of the assay.

Assaying & refining are operations of the same kind. The Assayer refines a small piece of any mass of gold or silver & 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 & the silver 12 ounces fine. And this is fine gold & fine silver in the sense of the law. And all gold & silver is fine gold & fine silver in the sense of the law if it be of the same fineness with the Assay-piece. And because the Assayer works more exactly to a Rule then the Refiner & makes better dispatch, the Assay is made the standing universal Rule of valuing gold & silver in all nations in point of fineness, & the Law in ordeining that standard gold shall be 22 carats fine & standard silver 11 ounces two penny weight fine, means by the assay.

The assays of Gold ought to be made with two waters & no more, this being the constant practise of assaying, & the waters ought to be of the usual strength (the second water stronger then the first) & to work the usual time & in the usual heat, & the Assay-piece ought to be hammered to the usuall thinness that the Assays may be uniform. And the assays of silver ought to be made with a due proportion of Lead in a due & eaven heat, & as soon as the Lead is blown off, & the silver looks bright & glittering, the silver must begin to cool without roasting it, & it must cool slowly that it do not spring. But in refining gold & silver in great quantities these niceties are not observed

Assays are liable to errors, but the errors are generally very small & seldome exceed a quarter of a grain in gold or an halfpenny weight in silver. And by reason of these little errors, the Assayer in single Assays makes his report to no less then a quarter of a grain in gold & 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, & the assays agree without any considerable difference & a medium be taken between them: the fineness of the gold may be determined to less then half a quarter of a grain & the fineness of the silver to less then half an half penny weight. And this is the exactest way of assaying hitherto in use.

2 Of making the Triall-pieces.

The standard Triall-pieces are made by the Assay. First a Iury of workmen summoned & sworn by order of Council procures gold & silver refined by the Refiner; & assays them to see if they be of a just degree of fineness, that is the gold just 24 carats fine & the silver just 12 ounces fine. Then they melt this gold & silver severally with allay in due proportion & stirr them well together in fusion severall times to mix them very well, & pour them off before the Allay evaporates, & then assay them severall times to see if they be standard, taking assays from several places to see if the mixture be uniform**{.}** 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-piec**{**e.**}**

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Refiners find it difficult to refine gold to the degree of 24 carats. They seldome make it above 23 carats 3 grains 3 quarters of a grain fine, & by fine gold generally understand gold of this degree of fineness. And if gold at any time prove finer upon the Assay, Assayers out of prejudice do not report it finer. And thence it comes to pass 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 also it may have sometimes happened that at the making of new Trial-pieces the Assayer may have reported the fine gold not so fine as it really was, & by that means the Trial piece may have been made too fine. And if the fine gold was by $23^{car.}\ 3^{gr.}\ 3^{qters}$ fine, the Trial piece may have been made too coarse. And there are other ways of erring as by assaying after any

unusual manner, or by scattering any part of the allay or of the gold or suffering a sensible quantity of the allay to evaporate or not mixing the gold with the allay very well, or using a faulty crucible.

3 Of trying the Pix.

1 The tryall of the moneys in the Pix is to be performed by a Iury of Assayers in the < insertion from f 289r > presence of the Warden Master & Comptroller of the Mint < text from f 288v resumes > 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 exprest in the Indenture of the Mint The Pix is opened & the Iury sworn before her Majesty or such of her Council as her Lordship shall appoint. If the Triall pieces be exactly made the trial thereby is the most expedite & the least liable to errors. But a Trial piece may happen to be erroneous & then the other ways of assaying, as they are lawfull, so also they may be usefull. For the Assay by the Assay weights exactly performed will discover the error of the Trial piece if there be any, & how great that error is, & the Assay by the touch may be also used to see how it agrees with the other Assays, but it is be less exact & not to be depended upon alone.

3 If at any time the Trial-piece doth not agree with the Assay, either the error must be reported by the Iury 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 Trial piece must be made. If it must not be reported the Master must go on to coin the money by an erroneous Trial piece, & the Goldsmiths must have it in their power to alter the standard without controll as often as they are to make a new Trial-piece, & to make a new standard instead of making a new Trial piece agreeable to the standard established by law.

2 At the last trial of the Pix the gold money was standard full by the Assay, & the Trial piece a quarter of a grain better then the money, & the Iury in their Veredict represented the money a quarter of a grain worse then standard by the Trial piece. . This Trial piece was made A.C. 1707 it was made (I think) without the Queens order & by my Assays very carefully made is five twelfts of a grain better then standard, that of 1688 made by order of King Iames II is a sixt part of a grain better then standard, & 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, whether are not the Iury to report the error?

Quære 2. If any doubt arise about the manner of the Report or Veredict, whether are not the Iury to make a special Report of the matter of fact, & leave it to the Queen & Council to make a judgment thereupon?

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Of the fabrication & triall of the moneys of Gold & silver by the assay.

Assaying & refining are operations of the same kind. The Assayer refines a small piece of any mass of gold or silver & 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) it two carats better then standard, or twenty & four carats fine: & this is fine gold in the sense of the Law. The Assay-piece therefore when the Assayer works exactly becomes fine gold or fine silver in the sense of the Law. And all gold & silver in the sense of the law is fine gold & fine silver if it be of the same fineness with the Assay-piece. And because the Assayer works more exactly to a rule then the Refiner, & makes better dispatch, the Assay is made the standing universal Rule of valuing gold & silver in all nations in point of fineness, & the Law in ordeining that standard Gold shall be 22 carats fine & standard silver 11 ounces two penny weight fine, means by the Assay.

The assays of gold ought to be made with two waters & no more, this being the constant practise of assaying; & the waters ought to be of the usual strength (the second water stronger then the first) & to work the usual time & in the usual heat, & the assay piece ought to be hammered to the usual thinness that the Assays may be uniform. And the assays of silver ought to be made with a due proportion of lead in a due & eaven heat, & as soon as the lead is blown off & the silver looks bright & glittering, the silver must begin to cool without

roasting it, & it must cool slowly that it do not spring. But in refining gold & silver in great quantities these niceties are not observed.

Refiners find it difficult to refine gold to the degree of 24 carats. They seldome make it above 23 carats 3 grains & 3 quarters of a grain fine, & by fine gold generally understand gold of this degree of fineness. And if gold at any time prove finer upon the Assay, Assayers out of prejudice do not report it finer. And thence it comes to pass that the Goldsmiths are generally of opinion that Gold cannot be made above 24 carats fine. But if when they have watered their granulated gold once or twice with Aqua fortis, they should dulcify it & grind it very fine as painters do their colours, & then water it once or twice more with double Aqua fortis in the same degree of heat as before & keep it longer in the water then before stirring it now & then with a wooden stick to make the gold mix with fresh water: the gold would become finer then by the Assay, & by consequence finer then four & twenty carats. Chymists also tell us that Gold may be made finer by Antimony then by Aqua fortis & by consequence then by the Assay; & Gold refined by Antimony is of a better <291v> colour then Gold refined by Aqua fortis, & by reason of its fineness will go much further in gilding, as I have heard. But the Refiners of this city know not how to refine gold by Antimony. And so silver also by being tested with more lead & roasted becomes finer then by the common way of assaying, but not a half-penny weight finer.

If Refiners should work perfectly in the same manner with Assayers that is, if they should mix gold with silver in the same proportion & drive it off the test with the same proportion of lead & hammer it to the same thinness & water it with waters of the same strength in the same degree of heat during the same length of time, their gold would become just 24 carats fine. And by imitating the Assayer their silver would become twelve ounces fine. But they work not with so much curiosity & exactness. Their fine gold & fine silver must be assayed to know the just degree of fineness.

Assays are liable to errors, but the errors are generally very small & seldome exceed a quarter of a grain in gold & an halfpenny weight in silver. And by reason of these little errors the Assayer in single Assays makes his reports to no less parts then a quarter of a grain in gold & a 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, & the assays agree without any considerable difference, & a medium be taken between them: the fineness of the gold may be determined to less then half a quarter of a grain & the fineness of the silver to less then an half a halfpenny weight. And this is the exactest way of assaying hitherto in use

The standard Trial pieces are made by the Assay. First the Iury procures gold & silver refined by the Refiner, & assays them to see if they be of a just degree of fineness, that is, the gold just 24 carats fine & the silver just 12 ounces fine. Then they melt this gold & silver severally with allay in due proportion, & stir them well together in fusion several times to mix them very well, & pour them off before the allay evaporates, & assay them several times to see if they be standard, taking assays from several places to see if the mixture be uniform. They 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-piece

The trial of the moneys in the Pix is to be performed 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 exprest in the Indenture of the Mint. If the Trial piece be exactly made, the trial thereby is the most expedite & the least liable to errors. But a Trial piece may happen to be erroneus, & then the other ways of assaying, as they are lawfull so they may be also usefull. For the Assay by the Assay-weights exactly made will discover the error of the Trial piece if there be any & how great that error is; & the Assay by the touch being very easy may be also used to see how it agrees with the other Assays, but it is less exact & not to be depended upon alone.

The present case

At the last trial of the Pix the Iury by the Assay found that the money was standard full & the Triall piece a quarter of a grain better then the money, & the Iury in their Veredict that the money was **{**a**}** quarter of a grain worse then standard by the Trial piece. The <292r> Veredict imployed that the Trial-piece was standard & the money a quarter of a grain wors then standard, tho the Iury found by the Trial that the money was standard & the Trial piece a quarter of a grain better then standard. By my assays this Trial piece is five twelft parts of a

grain better then standard, that of 1688 is the sixt part of a grain better, that of 1660 is standard

Quære

If upon any triall of the Pix the Trial piece prove better or worse then standard, are not the Iury to ascertain & report the error, & may not the Master of the Mint by an Order of Council allow for that error in coyning the money by that Trial piece for the future without putting the Government to the trouble & charge of making a new one? Or must a new Trial-piece be made; or the money continue to be coyned & tried by a false Trial piece without inquiring into the error; & so the Company of Goldsmiths have it in their power without controll, to alter the standard as often as they are to make a new standard Triall-piece?

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The present state of the Coynage in relation to the fineness of the moneys.

Assaying & refining are operations of the same kind. The Assayer refines a small piece of any mass of gold or silver & by the decrease of its weight makes his report, & if there be no decrease, that is, if the mass be of the same fineness with the refined Assay piece, he reports it two carats better than standard, or twenty & four carats fine; & this is fine gold in the sense of the Law. The Assay-piece therefore when the Assayer works exactly becomes fine gold or fine silver in the sense of the law. And because the Assayer works more exactly to a rule then the Refiner, & makes better dispatch, the Assay is made the standing universal Rule of valuing gold & silver in all nations in point of fineness, & the Law in ordeining that standard Gold shall be 22 Carats fine & standard silver 11 ounces two penny weight fine, means by the Assay.

The standard Triall pieces are made by the Assay. First the Iury procures gold & silver refined by the Refiner, & then assays the same several times to see if they be of a just degree of fineness; that is, the gold just two carats better then standard & the silver just 18 penny weight better. And then the Trial-pieces are made the Iury assays them several times to see if they be standard. They must agree therefore with the Assay as exactly as is possible least there be two standards.

The assays of gold ought to be made with two waters & no more, this being the constant practise of Assaying, & the water ought to be of the usual strength, & to work the usual time, & in the usual heat, & the Assay piece ought to be hammered to the usual thinness that the assays may be uniform.

Refiners find it difficult to refine gold to the degree of 24 carats. They seldome make it above 23 Carats three three quarters of a grain fine, & by fine gold generally understand gold of this degree of fineness. And thence it comes to pass that the goldsmiths are generally of opinion that gold cannot be made above 24 carats fine. But if when they have watered their granulated gold once or twice with Aqua fortis, they should dulcify it & grind it very fine as painters do thir colours, & then dry it & water it once or twice more with double Aqua fortis in the same degree of heat as before, & keep it longer in the water then before, stirring it now & then with a wooden stick to make the gold mix with fresh water, the gold will become finer then four & twenty carats. Chymists also tell us that Gold may be made finer by Antimony then by Aqua fortis and consequence then by the Assay.

If Refiners should work perfectly in the same manner with Assayers, that is, if they should mix gold with silver in the same proportion, & drive it off the Test with the same proportion of lead & hammer it to the very same thinness & water it with waters of the same strength in the same degree of heat during the same length of time; their gold would become just 24 carats fine. But they work not with so much curiosity & eavenness. In the fineness of gold made fine by the Refiners art there is much more uncertainty then in that of gold made fine by the Asaay.

The trial of the moneys in the Pix is to be performed after <295v> 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. If the Triall pieces be made exactly, the trial thereby is the most expedite & the least liable to errors. But a Trial piece may happen to be erroneous & then other ways of assaying may be also usefull. For the Assay by the assay-weights exactly made will discover

the error of the tryall piece if there be any, & how great that error is, & the Assay by the touch is also lawfull tho it be less exact & not to be depended upon alone.

At the last trial of the Pix the Iury by the Assay found that the money was standard full & the Trial piece a quarter of a grain better then the money, & reported in their Veredict that the money was a quarter of a grain worse then standard by the Trial piece. The Report implied that the Trial piece was standard & the money & quarter of a grain wors then standard, tho the Iury found by the triall that the money was standard & the trial piece a quarter of a grain better then standard.

When I came first to the Mint & for some years before, the Importers were allowed the advantage of almost all the Remedy & then the gold imported made about four pounds & two pence per ounce standard. The Goldsmiths now complain that their gold doth not make four pounds per ounce. It should make only three pounds nineteen shillings & eight pence three farthings, & so much it hath made ever since the last trial of the Pix.

While the Importers were allowed the advantage of almost all the remedy, there wanted about thirty grains of fine gold in four & forty guineas & an half, & as much or more fine silver in sixty & two shillings. There is now the just quantity of gold & silver in the moneys, & there wants only about 15 grains of copper in $44\frac{1}{2}$ Guineas, or the thirds part of a grain of copper in a Guinea, which want is of no value or consequence being less then the thousandth part of a penny, & is occasioned by the want of so much allay in the trial pieces.

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The present state of the Coynage in relation to the fineness of the moneys.

Assaying & refining are operations of the same kind. The Assayer refines a small piece of any mass of gold or silver & by the decrease of its weight makes his report: & if there be no decrease, that is, if the mass be of the same fineness with the refined Assay piece, he reports it two carrats better then standard, or twenty & four carats fine: & this is fine gold in the sense of the Law. The Assay-piece therefore when the Assayer works exactly, becomes fine gold or fine silver in the sense of the Law. And all gold & silver of the same degree of fineness is fine gold & fine silver among merchants in the sense of the Law. And because the Assayer works more exactly to a rule then the Refiner, & makes better dispatch, the Assay is made the standing universal Rule of valuing gold & silver in all nations in point of fineness, & the Law in ordeining that standard Gold shall be 22 carats fine & standard silver 11 ounces 2 penny weight fine, means by the Assay.

The assays of gold ought to be made with two waters & no more, this being the constant practise of assaying; & the waters ought to be of the usual strength, (the second water stronger then the first,) & to work the usual time & in the usual heat, & the Assay piece ought to be hammered to the usual thinness that the Assays may be uniform. And the assays of silver ought to be made with a due proportion of lead in a due & eaven heat, & as soon as the lead is blown off & the silver looks bright & glittering, the silver must begin to cool without roasting it, & it must cool slowly that it do not spring. But in refining gold & silver in great quantities these niceties are not observed

Refiners find it difficult to refine gold to the degree of 24 carats. They seldome make it above 23 carats 3 grains & 3 quarters of a grain fine, & by fine gold generally understand gold of this degree of fineness. And if gold at any time prove finer upon the Assay, Assayermasters out of prejudice do not report it finer. And thence it comes to pass that the Goldsmiths are generally of opinion that gold cannot be above 24 carats fine. But if when they have watered their granulated gold once or twice with Aqua fortis, they should dulcify it & grind it very fine as painters do their colours, & then water it once or twice more with double Aqua fortis in the same degree of heat as before & keep it longer in the water then before stirring it now & then with a wooden stick to make the gold mix with fresh water the Gold will become finer then by the Assay, & by consequence <297v> finer then four & twenty carats. Chymists also tell us that Gold may be made finer by Antimony then by Aqua fortis, & by consequence then by the Assay; & Gold refined by Antimony is of a better colour then Gold refined by Aqua fortis, & by reason of its fineness will god much further in gilding as

I have heard. But the Refiners of this city know not how to refine gold by Antimony. silver by more lead & being roasted, becomes finer then by the common way of assaying, but not a halfpenny weight finer.

If Refiners should work perfectly in the same manner with Assayers, that is, if they should mix gold with silver in the same proportion & drive it off the Test with the same proportion of lead & hammer it to the very same thinness & water it with waters of the same strength in the same degree of heat during the same length of time; their gold would become just 24 carats fine. And by imitating the Assayer their silver would become 12 ounces fine. But they work not with so much curiosity & eavenness. Their fine gold & fine silver must be assayed to know the just degree of fineness.

The standard Triall Pieces are made by the Assay. First the Iury procures gold & silver refined by the Refiner, & then assays the same several times to see if they be of a just degree of fineness, that is the gold just two carats better then standard & the silver just 18 penny weight better. And when the trial pieces are made the Iury assays them several time to see if they be standard. They 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 Triall-piece. And assay taken from them in several places must agree with one another to see if the fine gold & fine silver be eavenly mixed with the allay.

The triall of the moneys in the Pix is to be performed 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 If the triall piece be exactly made, the triall thereby is the most expedite & the least liable to errors. But a Triall piece may happen to be erroneus, & then the other ways of assaying, as they are lawfull, so they may be also usefull. For the assay by the assay-weights exactly made will discover the error of the Trial pieces if there be any & how great that error is; & the Assay by the touch being very easy may be also used to see how it agrees with the other assays, but is less exact & not to be depended upon alone

At the last Trial of the Pix the Iury by the Assay found that the money was standard full & the Triall piece & quarter of a grain better then the money, & reported in their Veredict that the money was a quarter of a grain worse then standard by the Trial piece. The Veredict implied that the Trial piece was standard & the money a quarter of a grain wors then standard tho the Iury found by the Triall that the money was standard & the <298r> Trial piece a quarter of a grain better then standard. By my assays this Triall piece is five twelfts of a grain better then standard, that of 1688 is a sixt part of a grain better, that of 1660 is standard. Quære If upon any Trial of the Pix the Trial piece prove better or worse then standard, are not the Iury to ascertain & report the error? & may not the Master of the Mint by an Order of Council allow for that error in coining the money by that Trial priece for the future, without putting the Government to the trouble & charge of making a new one? Or must a new trial piece be made or the money continue to be coyned & tryed by a fals trial piece without in **{illeg}**ing in the error & so the Company of Goldsmiths have it in their power without controll to alter the standard & make a new standard as often as they are to make a new standard tryal piece?