

## Locke, Newton and Monetary Justice

Ludovic Desmedt <sup>1</sup>

<sup>1</sup> Cemf/Fargo/LEG (UMR 5118),  
Université de Bourgogne,  
Pôle Economie-Gestion,  
2 Bd Gabriel, 21 000 Dijon

*Preliminary version – do not quote*

Money is not only a collection of objects, but an institution based on the trust the members of a society invest in it. During centuries, mistrust of the currency impeded the development of production and investment on the long run. Hence, until the end of the 17<sup>th</sup> century, most debates concerned not so much the quantity of coins as their quality. It took the form of the so-called “Gresham’s law”: in Europe, “good” (lawful) and “bad” coins (shaved, clipped, counterfeited) circulated. In England, after 1663, old (hammered) coins were used in everyday payments<sup>1</sup> while new ones (machine-made) were hoarded or exported. ‘Light’ money circulated freely and, at some periods, the money system was so confused that counterfeiters could issue better coins than Mints (see below)... hence anyone might accept counterfeit coins. As was emphasized by Locke, “bad” coins were accepted not only in ordinary commercial transactions, but also by the Exchequer in payment of taxes<sup>2</sup>. This situation can be analyzed in terms of a conventional pattern: “A medium of exchange – say, coin of the realm – has its special status by a convention among tradesmen to take it without question in return for goods and services. [...] the inconvenience of accepting a bad medium of exchange is less than the inconvenience of refusing it when others take it, or of taking what one can neither use nor spend.” (Lewis, 1969: 48). Up to a certain point: when too many “bad” coins proliferated, public faith could totally vanish.

During the Glorious Revolution (1688), the “fiduciary power” of the English currency fell at a very low level. In his *History of England*, Macaulay insisted on this topic: “The evils produced by this state of the currency were not such as have generally been thought worthy to occupy a prominent place in history. Yet it may well be doubted whether all the misery which had been inflicted on the English nation in a quarter of century by bad Kings, bad Ministers, bad Parliament, and bad Judges, was equal to the misery caused in a single year by bad crowns and bad shillings.” (Macaulay, vol.V, p.90). In the 1690’s, trust in monetary instruments vanished almost completely. Indeed, while the war opposing Great Britain with France was prolonged<sup>3</sup>, a severe financial and monetary crisis burst. “In 1696, it was not clear that the financial demands of the war would be met. If they were not, if national bankruptcy ensued, the revolutionary settlement would undoubtedly collapse before a second Stuart restoration.” (Westfall, 1994, p.221). The new regime was in peril. In the monetary domain, clippers and counterfeiters committed illegal attacks on coin and Locke described a situation in which “...all the current Cash [was] light, clip’d, and hazardous Money” (Locke, 1695, p.104/1991b, p.475)

---

<sup>1</sup> “some pieces contained a little more and some a little less than the just quantity of silver; few pieces were exactly round; and the rims were not marked. It was therefore in the course of years discovered that to clip the coin was one of the easiest and most profitable kinds of fraud.”, Macaulay, 1890, vol. V, p.85.

<sup>2</sup> “I say, clip’d Money, however bad it be, will always pass whilst the King’s Receivers, the Bankers of any kind, and at last the Exchequer takes it.”, Locke, 1695, p.97/1995b, p.471. Locke maintains that the state’s continued acceptance of lightweight coin was responsible for the deterioration of the confidence in the currency, see below.

<sup>3</sup> “William III’s accession to the throne not only plunged England into a general European war, it also signalled the beginning of a century of Anglo-French confrontations around the world.”, Appleby, 1978b, p.270

What could be the proper cure for this proliferation of bad, or 'hazardous', currencies? This question was not confined to morals, since it was also a legal problem. Indeed, during centuries, the false money problem was not only technical (a matter of minting techniques); it was economical (a matter of economic troubles), political (a matter of sovereignty), moral (a matter of fairness) and legal (a matter of repression). Religious authorities took part in the prosecution of counterfeiters, who introduced suspicion and confusion into the society. In 1123, by the council of Latran, counterfeiters and « circulators of base coins » were declared oppressors of the poor, disturbers of the state and, therefore, excommunicated (in 1583, the council of Tours reiterated these sanctions) (Ruding, 1819, I, p.167). These questions were still discussed in churches at the end of the 17<sup>th</sup> century, as evidenced by the *Sermon against clipping* by William **Fleetwood** in England. For the bishop of Ely, clipping was not only illegal, but also "sinful", "as being a fraud upon every person" (Ruding, 1840, II:35).

"The tradition of Roman law saw the right to mint as a royal prerogative and treated any infringement of this regalian privilege as a form of lese majesty or high treason." (Sargent and Velde, 2003:65)

At this critical moment, Houghton evoked « an universal Murmur and Discontent amongst Multitudes of [His Majesty's] Subjects which may give the *Government* more Disturbance than all the Enemies thereof dare pretend to", (Houghton, 1695, p.17). Two solutions to the problem were proposed: either to devalue the currency, or to maintain the standard (recalling coins from circulation and re-minting them at full weight). Opposed to Lowndes' (and many others) proposals, Locke's bullionist position proposing a general recoinage became 'almost a gospel for "sound money" men', (Feavearyear, p.147). The philosopher attempted to introduce an unvarying standard, but without serious monetary **surveillance**, his proposal could fail. John Locke and Isaac Newton succeeded in gaining and keeping high official position in the *Glorious Revolution's* new regime. Both men were friends<sup>4</sup>, close to the Royal Society and to the *Whig junto* (Newton stood briefly in the Parliament just after the Revolution). They also shared a common interest with alchemy<sup>5</sup>. Locke and Newton mobilized specific theoretical and practical grounds in order to solve the problem of counterfeiting. Locke's arguments against debasement constituted a landmark for the English monetary history. But Newton's policy as Warden of the Mint was crucial to put Locke's principles into practice. The most influential political thinker and the greatest scientist of the time had been united by a common goal, the stabilization of English coinage. Hence, Lockean politicks (a sound currency should act as an anchor) and Newtonian principles (an empirical precision in the definition of monetary instruments) converged on the theme of monetary justice. To use the vocabulary of the day, the "world politick" and the "world natural" **were set in coherence**<sup>6</sup>.

In this text, we will first present the main characteristics of the English currency system and of the legal (and moral) aspects of monetary justice; we will then explain the controversies over the currency (Locke versus the 'devaluationists'). Finally, we will explain how, by the means of the stabilization of the English currency, Locke and Newton heralded what has been considered as a monetary revolution<sup>7</sup>.

---

<sup>4</sup> « Each recognized in the other an intellectual peer. », Westfall, 1994, p.199.

<sup>5</sup> See Westfall. Newton published the *Principia* in 1687, Locke his *Essay on human understanding* in 1690.

<sup>6</sup> See Jacob, 1976.

<sup>7</sup> "it must be stressed that during *precisely* the same period in which the Bank of England was established and the full transferability of debt was made legally enforceable, the precious metal coinage was greatly strengthened. [...] As credit-money became the most common means of transacting business, England *also* moved towards the creation of the strongest metallic currency in history.", Ingham, 2004, p.129.

Second Treatise, pp 319 (?) “And thus came in the use of Money, some lasting thing that Men might keep without spoiling, and that by mutual consent Men would take in exchange for the truly useful, but perishable Supports of Life.”  
An anchor of the new system in nature

## I The English currency system (at the end of the XVIIth century)

Locke's major works upon the theory and practice of the political power (his *Treatises of Government*) greatly influenced the new English regime. In 1689, after James II had to flee to France and was replaced by William of Orange, England embarked on the War of the Grand Alliance against France (which lasted until 1697). The experience proved a ruinous one, especially as trade with the Continent became difficult and the agricultural sector recorded a series of poor harvests. The English army stationed in Flanders at expensive costs. The debt increased considerably<sup>8</sup>. While the war opposing Great Britain with France was prolonged, a severe monetary crisis burst. “The currency troubles, also largely a consequence of war, had first come to the attention of Parliament in 1689, and were to loom increasingly large over the next seven years as England's commitments on the Continent grew. By 1695 the whole monetary system seemed in danger of collapse” (Kelly, 1991, p.17). Hence, during the Glorious Revolution, the “fiduciary power” of the English currency fell at a very low level, and trust in monetary instruments vanished almost completely. During the crisis, the connection between money of account and real money was at the centre of debate.

### 1.1) “*The Ill State of the Coin of the Kingdom*”<sup>9</sup>

An official coin under the metallic monetary system of the early modern period is made of a piece of metal, the mark of the sovereign, and a legal value expressed in the official unit of account. The system was based on two forms of money, *real* (metallic coins) and *imaginery* (unit of accounts). Coins bore images and symbols, but their value in unit of accounts wasn't indicated (hence the power for the king to manipulate their value): people counted in pounds, shillings, pennies, but paid in local (or foreign) coins (*crowns, farthings, guineas...*).

#### Coins circulating in England at the end of the XVII<sup>th</sup> century

Silver : *crown, halfcrown, shilling, six pence...*

Gold : *Guinea (1 guinea = 1£, since 1670), unite ...*

Copper : *farthing, half penny...*

Foreign coins : *French and Spanish pistoles, flemish ducatoons, portuguese crusados ...*

England was under an official silver standard. “In England at the time of the accession of William III, the mint-price of an ounce of silver was 5s. 2d., that is 1/62 of an ounce of silver was called a penny and 12 of these pence were called a shilling.” (Marx, 1859). During the 1690's, officers of the mint coined five shillings from an ounce of silver.

Locke presented the Invention of Money as an agreement that ‘a little piece of yellow Metal, which would keep without wasting or decay should be worth a great piece of flesh or a whole leap of corn’ (Locke, ST, V of property, 37, p.20), but in fact, some coins circulated for more than a century, hence “underweight coins, many with less than half the worth by weight of the value they represented, had circulated more or

<sup>8</sup> About the war and its consequences, Macaulay wrote : “Such was the origin of the debt which has since become the greatest prodigy that ever perplexed the sagacity and confounded the pride of statesmen and philosophers.”, Macaulay, 1890, vol. IV, p.396.

<sup>9</sup> A phrase often used in official reports, see for example, Fay, 1935. The King used it, see Horsefield, p.48.

less freely in England for decades.” (O’Brien, 2007, p.686). Degradation resulted from inevitable wear and tear of coins in their daily use, a situation which obviously did not involve fraudulent manipulation. But individuals could degrade coins in order to collect the metal and, consequently, either bring it to the Mint (and get coins corresponding to the weight of the metal), or sell it, or mint counterfeit coins by themselves. Some people found a profitable business in ‘clipping’ coins, slicing off silver from the edges and melting down the shavings<sup>10</sup>. According to some writers, “it was clip’d almost to the innermost Ring, and the Border of Letters either wholly take, away, or very much diminished.” (An., 1696, p.2)

The counterfeiter’s gain was due to the discrepancy already existing between the legal value and the metallic content of the degraded circulating coins. If one *Crown* should officially contain 1,25 oz. of silver, since there was a general clipping, the counterfeiter could -for example- produce two *Crowns* with this quantity of silver.

After 1663, a mill was introduced in the London Mint. As a result, people started to distinguish hammered coins (struck before 1663) and milled money (coins with milled edge). “Bad” coins varied in weight while new ones were more homogeneous. Moreover, in England, the official rating of silver was undervalued, while gold was overvalued. This created an incentive to melt down English silver coin and export it as bullion to Europe.

“By Isaac Newton’s estimate, at the start of the war silver accounted for 72.3 percent of the total stock of English coin, and of this 78.1 percent was hammered money”. Kleer, p.535

The clipped coins drove the milled coins (opposed to hammered ones) out of circulation.

For all these reasons (wear and tear, clipping, counterfeiting), the discrepancy between the silver content and the official value of the coins grew significantly. The last general recoinage was implemented in 1601. Some officials (see below) estimated that the currency in circulation contained only half of the value (by weight) of its precious metal content. “A trial showed that £57,200 in silver coins, whose weight ought to have been 220,000 ounces, weighed only 141,000 ounces.” (Marx, 1859). All observers blamed the sorry state of metallic currency. In 1689 the Commons appointed a committee “to consider of the great Abuses committed in the impairing the Coins of the Kingdom”, but with little results.

Hammered (light and corrupted) coins were in daily use, while milled ones were hoarded or exported to the continent. “Fresh wagonloads of choice money still came forth from the mill; and still they vanished as far as they appeared.” (Macaulay, vol.V, p.87). “Of the £13,5 million remaining in circulation at the beginning of 1694, £10 million was hammered money and £1 million “condoned and acceptable counterfeits » », Horsefield, 1956, p.241. Most coins were clipped, countefeited or deteriorated (hammered).

Gresham’s law (on that subject, Macaulay quoted Aristophane, not Gresham... vol.V, p.86)

In 1694, to finance the war, the Bank of England was founded. The same year, the foreign exchanges began to move sharply against England. 'And although taxes were multiplied upon account of the war, yet it was feared the distraction about the coin would be more fatal than the war with France.'<sup>11</sup>

---

<sup>10</sup> « Le métier de rogneur de monnoye, says L'Hermitage, est si lucratif et paroît si facile que, quelque chose qu'on fasse pour les détruire, il s'en trouve toujours d'autres pour prendre leur place. », N. Luttrell, 1/11, 1695, quoted by Macaulay, 1890, vol.V, p.88.

<sup>11</sup> “A Lancaster Grocer's Comments on the State of the Coinage, 1693-6”, in Thirsk, Cooper, 1972, pp.698-701, p.699.

During the 1690s, the scale of the clipping exerted on hammered coins increased extremely quickly: the discrepancy between the legal weight of the coins received in payment for taxes and their real weight went from 12 % in 1686 to 24 % in 1693, then to 55 % in 1696 (Kelly, 1991)! The ordinary silver coin was found to contain one half the weight of silver it was supposed to contain.

The common concern about the state of the circulating coins came from the anxiety and confusion present in everyday trade.

## 1.2) The Coinage crime

Addison, in his *History of a Shilling*, gave voice to a coin narrating its adventures, from the mines of Peru to the pockets of Londoners. The coin was eventually seized by a clipper who dismembered it: "I fell into the Hands of an Artist who conveyed me under Ground, and with an unmerciful Pair of Sheers cut off my Titles, clipped my Brims, retrenched my Shape, rubbed me to my inmost Ring, and, in short, so spoiled and pillaged me, that he did not leave me worth a Groat." (Addison, 1710: 187). This image is very fruitful. It was not only the petty coins that were dismembered, but the society as a whole. For example, if clippers exercised their craft on the English coin named *Crown*, clipping this coin meant eroding the King's representation, so "shaving, clipping, and filing the King's head stamped on the coin became a highly symbolic decapitation." (Wennerlind, 2004: 140). Clipping, filing or shaving coins could be seen not only as a fraudulent practice, but also (and above all) as a political act.

Pêché : Sermons : « ... this great thing that was to counter-balance, and (as the Preacher says it does, *Eccles. X. 19*) to answer all things else, was what we now call *Money*." (Fleetwood, p.3)

At the end of the 17<sup>th</sup> century, these questions were still discussed in churches, as evidenced by the *Sermon against clipping* by William Fleetwood in 1694 in England. For the bishop of Ely, clipping was not only illegal, but also "sinful", "as being a fraud upon every person" (Ruding, 1840, II:35). His *Sermon* addressed the case of false money in a precise and detailed manner. The bishop insisted on the fact that currency was founded on an act of faith: "For the Publick Faith engages, that every Man receiving a Piece of such a Mark and Denomination, shall receive in it so much Silver, and of such a Fineness" (Fleetwood, 1694, p.8). "The *Heads* of Princes are not only stamp'd for Ornament and Honour, and to declare who are and have been Governors of such a Nation, but publickly to vouch the true intrinsic worth of every Piece, and tell Men that they there receive so much silver, and of such a fineness, and that that Image warrants it : And for this cause it has been always highly Penal to Counterfeit the Publick Stamp, and to Coin Money, tho' of equal Weight and Goodness with the King's [...] if this were indulg'd to private People, the World would fall again into distrust and fear..." Fleetwood, 1694, p.6

Price increases were generally attributed to the poor quality of coins, currency became doubtful, there was a 'flight out of money'. One Bristol merchant reported, "twas the Fear and constant Expectation of the calling in and mending our Silver Money, and as a Consequence thereof the falling of Guineys, which made every Man willing to shift off the loss, and to discharge himself of his Money, as fast as he receiv'd it, by turning it into some Commodities".<sup>12</sup>

The confusion created "so much difficulty [...] and Paying and Receiving of Money become the greatest Perplexity of the People" (Houghton, 1695, p.4).

Ailleurs : « For Money is the common Pawn or Pledge, that one man takes, in hopes of parting with it to another, for what he wants, whenever he sees it.", Fleetwood, p.4

---

<sup>12</sup> Cary, 1696, p.10.

## II The controversies over the currency (1694-96)

The coinage problem in the 1690's produced intense controversies, at least 300 pamphlets being published. Locke contributed to the debate with *Some Considerations*, published anonymously in 1691, and with *Further Considerations* four years later.

### 2.1) Lowndes and devaluationnists

The members of the Treasury, convinced of the need to issue new coinage, entrusted their secretary William Lowndes with the preparation of a plan to remedy matters. Lowndes published his *Report containing an Essay for the Amendment of the Silver Coins* in late 1695. In the report, he developed the idea that inflation is brought about by the circulation of coinage of unequal quality, which causes uncertainty about the fixing of prices.<sup>13</sup> "The war, he maintained, had induced an adverse balance of trade. The trade deficit had led in turn to massive exports of silver. Domestic scarcity had driven up the value of silver." (Kleer, 2004, p.540). Apart from reminting the most badly damaged coins, Lowndes' solution involved increasing the extrinsic value of silver coinage<sup>14</sup>. The silver crown should pass by decree from 5 shillings. to 6 shillings and 3 pences, the silver Mint price (5 shillings 2 pences par once sterling) brought to its market price (6s. 5d.).

In a metallic monetary system, the prince can dictate the issuing rules, such as the relationships between the unit of account and the means of payment. Gould (1970) distinguishes three kinds of monetary manipulations: a) reducing the weight of coins; b) reducing the degree of fineness of the gold (or silver)/alloy mix from which they were struck; c) tariffing the coins at a higher valuation in terms of money of account, while leaving their physical characteristics unchanged. The first method, (a), was simply called 'making the coins lighter', 'debasement' strictly speaking corresponds to case (b), while (c) characterizes 'enhancement'.

Adopting Lowndes' measure would have been equivalent to devaluing the nominal standard by 20 per cent (with one pound sterling representing 4/5ths of its worth in silver compared with the earlier ratio): "Instead of saying pay back 4 ounces of silver for every 5 ounces you received nominally but which contained in fact only 4 ounces of silver, he said, on the contrary, pay back nominally 5 ounces but reduce their metal content to 4 ounces and call the amount you hitherto called 4/5 of a shilling a shilling.", Marx, 1859.

According to Lowndes, history showed that devaluation was an effective method of currency management. Arguing along the lines developed by Lowndes, a number of commentators came out in favour of devaluation. Most belonged to the *Country Party*, which was hostile to the Whig government's plans. Lowndes proposals aimed at increasing the nominal value of the money distributed; likewise, for Barbon, the most marked effect of enhancement would be to increase monetary circulation, which would stimulate trade. His *Discourses concerning Coining the New Money Lighter* (1696) was a total refutation of Locke's views. Charles Davenant, as a Tory pamphleteer, thought that a law promoting the assignability of debts would be very productive<sup>15</sup>. Davenant claimed, 'Money is the servant of trade'.<sup>16</sup> In this perspective,

---

<sup>13</sup> See Lowndes, 1695, p.115.

<sup>14</sup> "His ultimate objective was to clear the way for new war loans", Kleer, 2004, p.553.

<sup>15</sup> "[...] if there were an Act of Parliament for transferring Debts or Bills of Debt from one person to another [...] Such Bills might become a legal Security, they would pass here currently as Bank Bills do, and be Transferred from party to party, and in a great Measure stand in the room and place of Money, as they really do in other Nations.', Davenant, 1695a, p.62.

<sup>16</sup> Davenant, 1698, part II, p.16.

the money supply had to be studied alongside the requirements of the economy. Most devaluationists insisted on the relationship between circulation and the degree of activity. 'When this *Medium* grows scarce, Trading will be low.'<sup>17</sup> For William Hodges circulation was all that mattered: 'For though the *old money* was exceeding bad, yet it served to Trade with, and go to *market*. And as many use to say, *If it was Leather, if it would pass, it would serve*'.<sup>18</sup> Accordingly, the boom in business relied essentially on the circulation of paper credit, and therefore on the principle of mutual agreement. Like Lowndes, these commentators emphasized the conventional connection between the unit of account and the precious metal content of the means of payment. Barbon asserted: 'the Money has its value from the Authority of that Government where it is Coin'd, by which it is made Current and Lawful Money'.<sup>19</sup> So what matter whether this money appeared in the form of metal or as notes, 'For Money is nothing but a *Medium* of Commerce'.<sup>20</sup> Freed from its metallic straitjacket, circulation would adapt to growth.

In this context, Somers (Lord keeper of the Seal) urged Locke to publish a work criticising each point of Lowndes' proposals and pleading for a general recoinage.

## 2.2) Monetary justice according to Locke

Locke established the foundations for modern classical liberalism. For the philosopher, economic operations are logically prior to government, and government remedies inconveniences that arise in the state of nature. For Locke, the state's function is "to annihilate the criminal" (Caffentzis, 1989, p. 71).

Locke entered the debate over the coinage with the publication of *Some Considerations of the Consequences of the Lowering of Interest, and Raising the Value of Money* (SC, 1692) and *Further Considerations Concerning Raising the Value of Money* (FC, 1696)<sup>21</sup>. The author of *Two Treatises on Government* based his analysis on the metal content of currency, "For 'tis Silver and not Names that pay Debts and purchase Commodities".<sup>22</sup> Stamping coins, one of the sovereign acts *par excellence*, guaranteed the smooth carrying out of payments. The source of monetary disorders was to be found in the proliferation of misdeeds.

The monetary crime exceeded widely the scope of the traffic of precious metals: it affected the very foundations of civil society. Counterfeiters' (and clipper's) search for profit not only constituted a theft<sup>23</sup>, but a case of high treason. « [...] the injury done to the publick Faith, in this point, is that which in Clipping and false Coining hightens the Robbery into Treason " (Locke, *F.C.*, p.8/415).

"Clipping is the great Leak which for some time past has contributed more to Sink us than all the Force of our Enemies could do. 'Tis like a Breach in the Sea-bank, which widens every moment till it be stop'd." (Locke, 1695:472).

To summarize, « The clippers *were* more serious enemies of the state, in Locke's view, than the French regiments at Namur» (Caffentzis, 1989:43).

But the philosopher strongly resisted plans to devalue the currency. According to Locke, an enhancement would assimilate the State to a counterfeiter, because it would sell a lesser quantity of metal under the

---

<sup>17</sup> H.M., 1694, p.44.

<sup>18</sup> Hodges, p.14.

<sup>19</sup> Barbon, 1696, p.86.

<sup>20</sup> H.M., 1694, p.45.

<sup>21</sup> "John Locke, who championed the new bourgeoisie in every way – he took the side of the manufacturers against the working classes and the paupers, the merchants against the old-fashioned usurers, the financial aristocracy against governments that were in debt; he even demonstrated in a separate work that the bourgeois way of thinking is the normal human way of thinking – took up Lowndes's challenge.", Marx, 1859.

<sup>22</sup> Locke, SC, pp.146-147/312, repeated in Locke, FC, p.68/453; 'For nothing will pay Debts but Money or Moneys worth, which three or four Lines writ in Paper cannot be.', Locke, SC, p.29/232. 'The detachment of the money of account from its old weight and fineness was something which Locke was not prepared to comprehend.', Fay, 1933, p.149. According to Schumpeter's definition, Locke was a "theoretical metallist" (Schumpeter, 1954, p.288).

<sup>23</sup> "Clipping by English Men is robbing the honest Man", Locke, *FC*, p.13/417.

same name. Locke denied the fact that money was a political creation and insisted “on the sacrosanctity of the monetary standard”<sup>24</sup>. Thus its value could not be modified in a mindless way, and the public authority had to protect its stability. As Locke asserted, monetary policy must strengthen faith because “Altering the Standard [...] will weaken, if not totally destroy the publick Faith when all that have trusted the Publick, and assisted our present necessities [...], shall be defrauded of 20 *per Cent.*” (Locke, *FC*, p.13/417).

For “devaluationnists”, it was not the substance that cash is minted from, its metallic content, that mattered but the way credit was able to stimulate business and increase employment. On the contrary, Locke thought that coins possessed a natural value, which legislators and kings had to respect. Locke’s doctrine consisted in extracting money from the royal’s scope, thus leaving no latitude to the prince. The strength of this position which “naturalised” money<sup>25</sup> laid in its capacity to transcend the opposition between Whigs and Tories and to reconcile the point of view of the creditors and the land-owners. “Raising the coin” would “rob all *Creditors* of One twentieth of their Debts, and all *Landlords* One twentieth of their quit Rents for ever” (Locke, 1691, p.309). Locke hence emphasized the impact of a devaluation on the defrauding of creditors. « *Creditors and Landlords* : the classes to which Locke himself belonged, and whose interest, particularly that of the landlords, he tended to equate with that of the state. » (Kelly, 1991, p. 443)<sup>26</sup>.

Locke assigns the value of any coin to the silver it contains (by weight and fineness), not to the denomination stamped on it. “As he states in the original memorandum that was recast as *Some Considerations*, although the intrinsic value of silver ‘be not naturall but only in the opinion of men consenting to it’, once it has been established and made ‘universall’, that value has ‘the same effect as if it were naturall’, so that it is impossible for generations coming after this establishment to renegotiate its value.” (O’Brien, 2007, p.692)

Hence the King could not manipulate the standard at will.

‘Money is the *measure* of Commerce, and the rate of every thing, and therefore *ought to be kept (as all other measures) as steady and invariable as may be.*’ (Locke, *SC*, p.326).

Locke was metallist, whose priority was the necessity of building a stable and pure metallic monetary system which was falsification proof. “For what was at stake was not simply an economic proposition, but social subversion” (Caffentzis, 1989:35). The authorities should insure that the circulating medium was perfectly fitted to the standard: it was thus wise to practise a general recoinage, even at the price of deflation.

Devaluation, would be to the advantage of borrowers and hurt lenders, while a recoinage would have the symmetric impact.

In the debate over the coinage, Nicholas Barbon radically rejected the views defended by Locke<sup>27</sup>. Davenant objected also to recoinage<sup>28</sup>: in his view, this operation was a ‘Bloody Issue that in a Short time would emaciate & bring death the Body Politick’<sup>29</sup>. “The case for maintaining the existing standard was put by Child, Houblon, and Heathcote, and for devaluation by Wren, Newton, and Wallis, a clear division between financiers and mathematicians.”, Kelly, 1991, p.29. Isaac Newton produced a writing underlining

---

<sup>24</sup> See Appleby, 1978, p.64 and Kelly, 1991, p.29.

<sup>25</sup> “In the face of an impressive amount of evidence to the contrary, John Locke successfully asserted that the denominational value of English shillings could not be changed because the value of money was rooted in nature.”, Appleby, p. ; see idem p.68

<sup>26</sup> See H. Layton, *Observations concerning Money and Coin*, 1697, p.13, cited par Appleby, 1978b, p.58.

<sup>27</sup> He announces on the first page of the preface to his pamphlet on recoinage: ‘[...] by my silence I might seem to renounce my own Opinion, having some time since wrote a *Discourse of Trade* wherein the definition of Money differs from what Mr. Lock asserts.’, Barbon, 1696.

<sup>28</sup> See Hutchison, 1988, p.52.

<sup>29</sup> Davenant, 1696b, p.208.



that a recoinage, reducing the circulating coins, would cause a depression: "He therefore recommended a devaluation, and agreed with Lowndes in suggesting one of 20%.", Horsefield, p.52. The scientist would soon implement a monetary policy opposed to that idea.

### III Newton and the « monetary police » (1696-99)

With Locke's reasoning, clipping and counterfeiting were raised from petty crime to treason. Assimilating mere clipping to a crime of high treason towards the *Commonwealth* ensured the monopoly of the state by effectively punishing such a crime by capital punishment. At the same moment, Charles Montagu (later Earl of Halifax), Chancellor of the Exchequer (and President of the Royal Society), placed Isaac Newton (Fellow of the R.S.) at the lucrative post of Warden of the Mint at the beginning of the year 1696. As expected, Newton showed a great concern for accuracy, wanting coins to be made of the correct weight and fineness, varying as little as possible one from another. Newton and Locke shared a common interest about alchemy (in short, the art of transforming lead into gold), but in the public domain, they combated counterfeiters (who employed their skills to do the same operation for private gain)...<sup>30</sup>

#### 3.1) A "social crime" ? <sup>31</sup>

Landowners and most Whigs finished up accepting Locke's reasoning. Eventually, the King sought to assert the intangibility of the standard, which is why, under his impetus, the *Recoinage Acts* were promulgated (in January, 1696); the standard should not be changed, "bad" coins going to be demonetised. Hammered, clipped and false silver coins were to be melted and recoinage (milled)<sup>32</sup>. After May 4 1696, clipped coins were no longer legal means of payment. The Mint had to accept the decried coins and produce new ones from May 1696<sup>33</sup>. It was the first general recoinage since 1601.

According to Horsefield, (pp.30-31), Lowndes's plan (devaluation) would have reduced the coins in circulation by 16%, compared to more than 30% under Locke's proposal (restoration). The shortage of coin provoked a contraction of credit.

The "universal Murmur and Discontent amongst Multitudes", evoked by Houghton, grew notably. "The news that the Parliament and the government were determined on a reform of the currency produced an ignorant panic among the common people." (Macaulay, vol.V, p.104). Taxpayers could give pay with corrupted coins, but the population had to get rid of its hammered money quickly. "The shortage of money pressed particularly hard on the poor." (Appleby, 1978a, p.236). With its deflationary effects, the recoinage provoked a real « monetary famine »<sup>34</sup>. Nine days after demonetisation had been completed we can read in Evelyn's Diary: "Money still continuing exceeding scarce, so that none was paid or receiv'd, but all was on trust . . ." (see Horsefield, 1956, p.236).

---

<sup>30</sup> Newton ceased his recorded alchemical experiment the day he became Warden of the Mint (see Keynes, 1995, p.34)

<sup>31</sup> See Craig, 1946. "The words used by W. A. Shaw are even more significant: "In this conspicuous instance in 1696, when the advice of a philosopher prevailed in its counsels, the English Government went astray and committed a blunder" (Select Tracts . . . of English Monetary History [London, 1896])", Laslett, 1957, p.378.

<sup>32</sup> "And so for the first time since the great recoinage of the pollards in the year 1299, a recoinage was effected which restored entirely the standard that had existed before the debasement", Feavearyear (1931, p.135).

<sup>33</sup> See Li, 1963.

<sup>34</sup> R. Marx, 1980, p.97.

Macaulay : « Nothing could be purchased without a dispute. » (Macaulay, vol.V, p.91) ; “almost a total obstruction to trade”, *Petition for a Mint at Exeter*, 1696, in Thirsk cooper, p.706.

The distributive aspects of the recoinage provoked social upheavals. Some see the reform as a « social crime »<sup>35</sup>

“Alarmists predicted that the wealthiest and most enlightened kingdom in Europe would be reduced to the state of those barbarous societies in which a mat is bought with a hatchet, and a pair of mocassins with a piece of venison.”, Macaulay, vol.V, p.151.

The government, having great difficulty in financing the war, had to face the cost of a recoinage.

The government credit reached its lowest ebb; on May 6, 1696, there was a run on the Bank of England. The Bank couldn't produce the coins against its bills, and some feared the future: “their Bills, since they ceased to pay them [were] a new sort of Clip'd Money, which (since the first was stop'd) have continued or even increased our Disorders.” (An., 1696, p.52). But Sir John Houblon, Governor of the Bank, paid some sums and promised to pay the rest later. “Bank notes therefore became partly inconvertible.” (Feavearyear, 1932, p.132).

*“In November [1694, rumors spread that Parliament would soon demonetize clipped silver, letting the losses fall upon those in whose hands it now lay. Many began trying to trade away their clipped coin in favor of some more secure store of value. Prices of the chief monetary substitutes started climbing. Guineas rose to 30s. in June 1695, up from the 22s. customary in 1694.”* (Kleer, 2004, p.537).

“John Locke won the day and money borrowed in guineas containing 10 to 14 shillings was repaid in guineas of 20 shillings.”, Marx, 1859

“Even when payment was made, it might not be what it seemed: £10 000 in shillings and six pences to pay off the Fleet in 1696 was ‘rejected by ye lower Order of People’ because it was unsound coin.”, Linebaugh, p. 67.

Cost : 317 crises. The Bank of England advanced the sums to the Government.

Macaulay echoed the judgement of one of the Parliament's members: “I am afraid that the nation can bear neither the disease nor the cure.” (Macaulay, vol.V, p.101). The King informed by the new (credit) crisis considered that the recoinage had been a huge mistake.

Some riots broke out at Halifax and Kendal.

Newton came to the Tower of London in April 1696 to take up his new duties as Warden of the Mint (i.e. chief officer of the Royal Mint). The new Regime thought that “he was peculiarly qualified, because of his extraordinary skill in numbers, and his great integrity” (Hopton Haynes, clerk at the Mint, quoted by Macaulay, vol.V, p.158). He took an active involvement in the affairs of the Mint. Newton, into the ranks of « devaluationist » during the recoinage debate, did not decide the reform, but he took an active role in preserving the integrity of the coinage afterwards. From the time of his arrival, he had to pilot the modalities of the recoinage, that was, the organization in the entire English territory of the reception then the reintroduction of coins. The London Mint had nine presses working all day long, and Newton

---

<sup>35</sup> See Laslett, 1969, p.144.

supervised the erection of five temporary local mints at York, Exeter, Norwich, Bristol and Chester (led by Edmund Halley)<sup>36</sup>. Thanks to Newton, Edmund Halley obtained an office at Chester's Mint : "The renovation of the coinage resolved upon 1695 brought Locke, Newton, and Halley into office at the same time, an intellectual triumvirate the equal of which had rarely been assembled to serve any government, though Philosophy suffered as a consequence." (Manuel, 1968, p.231).

« Years later, the Earl of Halifax (as Montague became) used to remark that he could not have carried on the recoinage without Newton.", Westfall, 1994, p.222.

### 3.2) Discipline and punish: Newton at the Mint

While various punishments threatened "money criminals", during decades, they were tolerated within the society. For example, Samuel Pepys, visiting the Tower (the Mint), was told the story "of one that got a way of coining money as good and passable and large as the true money is, and yet saved 50 per cent to himself; which was by getting moulds made to stamp groats like old groats, which is done so well that there is no better in the world; and is as good, nay better, then those commonly go; which was the only thing that they could find out to doubt them by [...] and then coming to the Controller of the Mint, he could not, I say, find any other thing to raise any doubt upon, but only their being so truly round or near it." (Pepys, May 19, 1663, T.IV: 143-144) Counterfeiters may thus issue better coins than the Mints, when the currency is of bad quality! In this case, the Master of the Mint, recognising his inability to preserve a quality currency, avoided punishing the counterfeiter: "He was neither hanged nor burned, the cheat was thought so ingenious and being the first time they could ever trap him in it, and so little hurt to any man in it, the money being as good as commonly goes". (Pepys, id)

One important reason for such tolerance is that counterfeiting "lubricated" circulation by introducing specie, certainly not legal and whose value was not guaranteed, but which served to increase an inadequate money supply. In cases of monetary tightening, degradation could avoid some major drawbacks: for example, "a major depression and a collapse of credit, as happened in the 1590s, was averted because of the extent of clipping, as the clipped coins were, of necessity, increasingly accepted at face value." (Muldrew, 2001: 106)

Two Acts preventing counterfeiting were passed in 1696 and 1697 by which the prosecution of the cheater was expanded, so any proven appropriation of the privilege to mint coins really exposed perpetrators to capital punishment. Bishop Fleetwood explained that "Clippers are as truly Thieves and Robbers, as those they find upon the High-ways, or breaking up their Houses, and do as well deserve their Chains and Halts." (Fleetwood, 1694:17). So, the moral code condemned private money-makers, who deserved to be punished by heavy penalties: "Nothing can justify the severity of Legal Punishments, but their Necessity [...] therefore the laying open the Injuries and Mischiefs of Clipping and Coining is the readiest way to clear the Reason and Justice of such Laws, as doom to Death such Malefactors. [...] then putting Men to Death for Clipping and Coining is neither Cruel nor Unjust." (Fleetwood, 1694, p.20-21).

The Warden of the Mint possessed judiciary powers, he was in particular charge of the apprehension and prosecution of counterfeiters.

"from June 1698 to Christmas 1699, Newton appeared at the Mint on one hundred twenty-three days to examine two hundred suspects and informers.", Manuel, 1968, p.230. "He bought special clothes for

---

<sup>36</sup> Mintmarks identified the places of production: B: Bristol (September 1696 - September 1698), C: Chester (October 1696 - June 1698), E: Exeter (August 1696 - July 1698), N: Norwich (September 1696 - April 1698), Y: York (September 1696 - April 1698)

Humphrey Hall “to qualify him for conversing with a Gang of coyners of Note in order to discover them.”, Westfall, 1994, p.228

When hammered coins disappeared, clipping became more difficult (the new coins having milled edges), hence “many clippers had turned to counterfeiting [...] after May 1696, when clipping largely ceased to be practicable” (Craig, 194, p.139). So counterfeit coins were still produced in no small quantity.

Newton set himself the task of fighting counterfeiters with unequalled zeal. Indeed, “the pursuit of offenders remained half-hearted till Newton took over as Warden of the Mint” (Kelly, 1991, p.349). He personally collected information concerning suspects and pursued them<sup>37</sup>, which led to the execution of many offenders. “Newton became the detector, interrogator and prosecutor of the actual miscreants, helping fill Newgate and providing much employment for the hangman at Tyburn.” (Caffentzis, 1989:19) Those who tampered with the symbols of sovereignty were sentenced to capital punishment and publicly executed. “In the case of forgery, the more exemplary punishment called for in the statute was the gallows. [...] it represented the most solemn spectacle in the armoury of justice. It addressed the entire community.” (Mc Gowen, 1999, p.135). The prosecution of counterfeiters at the end of the 17<sup>th</sup> century became performances in which “spectators, by their viewing of the scene, became adjuncts of the state in establishing – one can even say coercing – respect for and compliance with the rules of the monetary system.” (Wennerlind, 2004, p.149)

The severity of the punishment indicates that the offences perceived before the crisis in an almost indulgent way were no longer tolerated. The officers of the “monetary police”<sup>38</sup> displayed a lot of energy. « During Newton’s first three years at the mint, he imprisoned more than one hundred suspected clippers and counterfeiters. In his first full year, there were at least fifteen executions at Tyburn for coinage crimes in London alone [...] », (Wennerlind, 2004, p.147). In 1699, Newton became Master of the Mint (and held this position to his death in 1727).

The recoinage was finally completed by the end of 1698. “The stock of silver had fallen from £14,8m (of which some £1,5 was counterfeit) to £9,5m”, Kelly, 1991, p.66.

“The diminishing our old silver coin increased, and made great confusion in trade, people being cautious in setting a price of their goods without knowing in what money they should be paid. And although taxes were multiplied upon account of the war, yet it was feared the distraction about the coin would be more fatal than the war with France.”, *A Lancaster Grocer’s comment*, 1693-1694, in Thirsk cooper, pp.698-699.

Moreover, “he devised the law of 1697 on dealers in tools and metals which for a time hampered criminals and indeed honest industry. He elaborated, unsuccessfully, a detailed scheme for a national commission to monopolize all counterfeiting informations, prosecutions, pardons and reprieves.” (Craig, 1963, p. 143).

**Land Bank : see “Blood in the body politick”** The Bank of England could pay its bills on demand at par at the end of 1697.

Under Newton’s directives, the London Mint produced as much coins during two years, nearly twice the coinage of the previous three decades... but the undervaluation of silver had not been corrected, and melting pots continued to “devour all” (mostly for exportation).

---

<sup>37</sup> Newton to the Treasury, October 1, 1699: “The prosecution of Coyners during the three last years having put me to various small expenses in coach-hire & at Taverns & Prisons & other Places...”, Newton, Correspondence, in Manuel, 1968, p.437.

<sup>38</sup> See Linebaugh, 1991 p.56.

## CONCLUSION

Judgement: “The Great recoinage was an expensive fiasco” (Finlay Shirras, Craig, 1945, p.229) ; “With the Great Recoinage of 1696, Britain [...] reaffirmed the medieval idea of a full-bodied commodity money” (Sargent, Velde, 2003, p.291).

“With the growth of private credit, in which the rise of capitalism had its origins, mistrust of the money of account hindered the productive utilisation of savings. [...] The monetary revolution preceded the industrial revolution by a good half-century. [...] the most important factor was the institution of a system in which a (private) bank issued a currency, trust in which was maintained by convertibility into a high quality metal currency constituting a monetary base which was itself linked to the unit of account via a ratio decreed by the sovereign.” (M. Aglietta, 2002, pp.41-42).

“The founding of the Bank of England, the expert management of the national debt, and the revaluation of the currency gave the Whigs the monetary tools with which to forge a vital link between the government and City wealth.”, Appleby, 1978b, p.272

By rejecting the secular habit of continual falsification, the currency was stabilized with respect to the system of account. “Largely as a result of Locke’s influence, £3 17s. 10 1/2d. an ounce came to be regarded as a magic price for gold from which we ought never to stray and to which, if we do, we must always return.” (Feavearyear, 1932, p.137)<sup>39</sup>.

The recoinage and the punishment of counterfeiters can be seen as symbolic acts, aimed at ensuring either the refoundation or the permanence of the monetary system and the underlying social order. Under Locke’s and Newton’s ferule, rules promulgated in correspondence to these ethics were respected, which consequently conserved the integrity of the coins. Locke’s system of the world (based on property and labour) and Newton’s system of the world (accuracy of definitions) coincided. Through the circulation of the new coins which had the inscription “*Decus and Tutamen*” (*Glory and Defence*) on their edge, the methodical or routine faith was restored. This reform prevented endless discussions about the quality of coins during transactions. The payment system appeared to be preserved.

Those changes can be seen as a monetary revolution: this reform prevented endless discussions about the quality of coins during transactions. The stabilization of the currency and the preservation of specie were the two faces of the same coin, i.e. the setting of a stable monetary medium. The expansion of English finance doubtless required such a supervision of the procedures of coinage necessary for a reliable delivery of the coins. To take Locke’s expression, England’s “Fiduciary Power” had been strengthened. The lengthening of credit terms required reassuring creditors as to the convertibility of their monetary and financial instruments. Only a solid degree of confidence in the money-object permitted financial developments, and eventually, industrialization<sup>40</sup>.

A report Newton wrote in 1717 paved the way for a reduction in the value of the guinea to 21 shillings, a decision that put England on a *de facto* gold standard. “Gold was henceforth tied to the money of account.” (Fay, 1935, p.112). Ironically, the guinea being over-valued by comparison with the rating of neighbouring countries, in spite of the silver recoinage, the silver flowed out and gold flowed in!

We can have some doubts on Locke’s and Newton’s successes in their alchemical attempts to transform base matter into precious metal, but they succeeded to transmute a chaotic system of payments into a sound one. Their ability to strengthen England’s coinage system is undisputable. The shortfall of metallic currency accelerated the development of various forms of paper securities.

---

<sup>39</sup> “Locke’s side won the debate over the recoinage, and the Mint rate that he had advocated set the standard for silver currency that lasted until 1918, when another wartime currency crisis forced Britain off a precious metal standard altogether », O’Brien, 2007, p.694

<sup>40</sup> “If the English state were not even able to maintain the authenticity and solidity of its own currency, London’s status as the center of the world currency seemed infeasible.”, Wennerlind, 2004, p.139.

## REFERENCES

- ADDISON J., 1710, "History of a Shilling", in Mackie, E., 1998, pp.183-187.
- AGLIETTA M., 2002, "Whence and Whither Money ?", *The Future of Money*, OECD
- ANONYMOUS, 1696, *A Review of the Universal Remedy for all diseases incident to Coin. In a Letter of Mr. Locke*, London
- APPLEBY, J.O., 1978a, *Economic Thought and Ideology in Seventeenth-Century England*, Princeton University Press,
- APPLEBY, J.O., 1978b, "Modernization Theory and the Formation of Modern Social Theories in England and America", *Comparative Studies in Society and History*, Vol. 20, No. 2, pp. 259-285, p.272
- ELTIS W., 1995, 'John Locke, the Quantity Theory of Money and the Establishment of a Sound Currency', in Mark Blaug et al, *The Quantity Theory of Money: From Locke to Keynes and Friedman*, Cheltenham: Edward Elgar
- CAFFENTZIS G.C., 1989, *Clipped Coins, Abused Words and Civil Government, Locke's Philosophy of Money*, Autonomedia, New-York
- CARY, J., 1696, *An Essay on the Coyne and Credit of England*, Londres
- CLAPHAM, J., 1944, *The Bank of England A History*, Cambridge University Press, 1966, vol.I
- CRAIG J., 1946, *Newton at the Mint*, Cambridge University Press, Cambridge
- CRAIG J., 1963, "Isaac Newton and the counterfeiters", *Notes and Records of the Royal Society of London*, 18, 2, pp.136-145.
- Davenant**
- DESMEDT L., 2007, « Les fondements monétaires de la Révolution financière Anglaise : le tournant de 1696 », in Théret (éd.) *La monnaie dévoilée par ses crises*, EHESS, Paris
- DICKSON, P.G.M., 1967, *The Financial Revolution in England*, Mc Millan, Londres
- FAY, C.R. 1935, "Newton and the Gold Standard", *Cambridge Historical Journal*, vol.5, 1, pp.109-117
- FAY, C.R., 1933, "Locke versus Lowndes", *Cambridge Historical Journal*, vol.IV, 2, pp.143-155.
- FEAVEAREYEAR, A.E., 1932, *The Pound Sterling, a History of English Money*, Oxford University Press, London
- FINLAY SHIRRAS, G., CRAIG J.H., 1945, "Sir Isaac Newton and the currency", *The Economic Journal*, 55, pp.217-241
- FLEETWOOD W., 1694, *A Sermon against Clipping*, London
- GODFREY, M., 1695, *A short account of the Bank of England*, in *Central Banking in History*, M. Collins éd., Elgar, vol.I, 1993, pp.1-8.
- GOULD J.D., 1970, *The Great Debasement in Mid-Tudor England*, Clarendon Press, Oxford.
- HODGES, W. 1696. *The groans of the Poor, the Misery of Traders, and the Calamity of the Publick*, London.
- HORSEFIELD, J.K., 1956, "Inflation and Deflation in 1694-1696", *Economica*, 91, pp.229-243.
- HORSEFIELD, J.K., 1960, *British Monetary Experiments, 1650-1710*, Harvard University Press, Cambridge Mass.
- HOUGHTON, T., 1695, *The alteration of the coin with a feasible method to do it*, London
- INGHAM, G., 2004, *The Nature of Money*, Polity Press, Cambridge
- JACOB M., 1976, *Newtonians and the English Revolution 1689-1720*, Cornell University Press
- KELLY, P.H., 1991, "General introduction", in *Locke on Money*, Clarendon Press, Oxford, vol.I, pp.1-121.
- KELLY, P.H., 1991, notes, in *Locke on Money*, Clarendon Press, Oxford, vol.II
- KEYNES, M., 1995. "The personality of Isaac Newton", *Notes and Records of the Royal Society of London*, vol.49, 1, pp.1-56.
- KREGEL, J., 1996, "The Policy Implications of the Current Bank Crisis, or, "Is Free Market Capitalism Compatible with Endogenous Money ?""", in G. Deleplace, E.J. Nell éd., *Money in Motion, The Post Keynesian and Circulation Approaches*, MacMillan, Londres, pp.651-671.
- LASLETT, P., 1969, « John Locke, the great recoinage , and the origins of the Board of Trade : 1695-1698 », in J. W. Yolton (éd.), *John Locke : problems and perspectives*, Cambridge, Cambridge University Press, p. 137-164
- LEWIS D.K., 1969 (1986), *Convention. A philosophical study*, Basil Blackwell, Londres

- LI, M.-H., 1963, *The Great Recoinage of 1696 to 1699*, Weidenfeld and Nicolson, London
- LINEBAUGH P., 1991, *The London Hanged. Crime and civil society in the eighteenth century*, Penguin, London
- LOCKE, J., 1689, *The Second Treatise of Government*, Basil Blackwell, Oxford, 1966.
- LOCKE, J., 1691, 2 ed., 1696, *Some Considerations of the Consequences of the Lowering of Interest, and Raising the Value of Money*, A.M. Kelley, New York, 1968
- LOCKE, J., 1695a, *Short Observations on a Printed Paper intituled, For encouraging the Coining Silver Money in England, and after for keeping it here*, A.M. Kelley, New York, 1968
- LOCKE, J., 1695b, *Further Considerations concerning Raising the Value of Money. Wherein Mr. Lowndes's Arguments for it in his late Report concerning An Essay for the Amendment of the Silver Coins, are particularly Examined*, A.M. Kelley, New York, 1968
- LORDS JUSTICES OF ENGLAND, may 1696, "The Recoinage of 1696 and Threats of Disorder", in Thirsk, Cooper, 1972, pp.707-708.
- LOWNDES, W., *A Report Containing an Essay for the Amendment of the Silver Coins*, Londres, 1695
- MACAULAY, T.B. 1861., *The History of England from the Accession of James II*, vol.IV and V, Donohue, Henneberry and Co, 1890, Chicago
- MC GOWEN R., 1999, "From pillory to gallows : the punishment of forgery in the age of the financial revolution", *Past and Present*, 165, pp.107-140
- MANUEL, F.E. , 1968, *A portrait of Isaac Newton*, Harvard University Press, Cambridge
- MARX K., 1859, *A Contribution to the Critique of Political Economy*
- MARX, R., 1980, "Banque, crédit et monnaie en Angleterre de 1640 à la fin du XVII<sup>e</sup> siècle", in *Argent et valeurs dans le monde anglo-américain aux XVII<sup>e</sup> et XVIII<sup>e</sup> siècles*, Université de Paris X, Paris, pp.96-113.
- MULDREW**
- O'BRIEN, J. 2007, "John Locke, desire, and the epistemology of money" , *British journal for the history of philosophy*, 15, pp.685-708.
- PATTERSON, W., 1694, *A Brief Account of the intended Bank of England*, Londres, in *Central Banking in History*, M. Collins éd., Elgar, Aldershot, 1993, vol.III, pp.1-18.
- PEPYS S., 1660-1669, *The Diary*, ed by R. Latham, W. Matthews, G. Bell and Sons, London, 11 vol.
- POWELL, E.T., 1915, *The Evolution of the Money Market, 1385-1915*, Cass & Co, Londres, 1966
- RICHARDS, R.D., 1929, *The Early History of Banking in England*, Cass & Co, Londres, 1965
- ROGERS, J.E.T., 1887, *The First Nine Years of the Bank of England*, Clarendon Press, Oxford
- RUDING, R., *Annals of the Coinage of Great Britain and its Dependencies*, 1840, John Heard, Londres, vol.II,
- SARGENT T., VELDE F., 2003, *The Big Problem of Small Change*, Princeton: Princeton University Press
- SHAW, W.A., *Select Tracts and Documents Illustrative of English Monetary History, 1626-1730*, Clement Wilson, Londres, 1896.
- THIRSK, J., COOPER, J.P., (éds), *Seventeenth-Century Economic Documents*, Clarendon Press, Oxford, 1972.
- VAN DER WEE, H., "Monetary, Credit and Banking Systems", in *The Cambridge Economic History of Europe*, vol.V, Cambridge University Press, 1977, 749p., pp.290-392.
- WENNERLIND C., 2004, « The Death Penalty as Monetary Policy : The Practice and Punishment of Monetary Crime, 1690-1830 », *History of Political Economy*, 36 :1, p.131-161
- WESFALL, R., 1994, *The Life of Isaac Newton*, Cambridge University Press, Cambridge.