Tooke (and Newmarch) on the Value of Gold and the Effect of the Mid-Nineteenth Century Gold Discoveries

Matthew Smith
University of Sydney

Abstract: This paper consists of two related sections for a book on Thomas Tooke. They concern Tooke's (and William Newmarch's) position on the determination of the gold (or silver) standard for the British monetary system effectively existing prior to 1797 and then officially resuming from 1821 onwards. Section 3.5 shows that Tooke adopted Ricardo's theory of value of a scarce natural resource, aspects of which were further developed by Senior, proposing that the natural price of gold or silver was determined by its cost of production at the least productive mine. Based on this theory, it is shown that Tooke well appreciated the conditions underlying the stability of the gold standard and, therefore, the long-run money price level fixed to gold. In section 5.5 the paper considers Tooke and Newmarch's position on the effect of the mid-nineteenth gold discoveries in California and Eastern Australia on the value of gold and the general price level. It shows that their position is not plausible from the standpoint of the Ricardian theory adhered to by Tooke.

3.5 Value of the 'Metallic Standard' and the Price Level

In the eighteenth and nineteenth centuries monetary values in Britain and other Western European nations were usually fixed to a designated metallic standard in peacetime, consisting of either gold or a silver standard, according to the official mint price per unit of quantity. Hence, classical economists conceived that on the basis of the given monetary standard, the normal money prices of commodities were determined by their exchange (or relative) value to the designated precious metal; that is, by the metallic (gold or silver) price of commodities. This meant that in the long run the general price level, however it was calculated as a theoretical construct, depended heavily on factors which determined the value of the 'metallic standard'. This was well understood by Tooke from the beginning of his studies.[1] However, Tooke's theoretical position on the determination of the 'metallic standard' only fully comes to light in his banking school writings from the early-1840s and afterwards.

[1] For example, in considering whether the 'value of the precious metals' diminished such as to influence the 'state of prices' during the period of restriction from 1807 to 1819, Tooke (1823, i: 177-180) refers to the 'metallic price of corn'. In addition, see Tooke's (1823, i: 8-42) examination of the role played by the value of the precious metals, mainly gold, on the value of pound sterling and money prices during the restriction period 1797-1821.

In his writings Tooke does not provide a clear account of his theoretical position on the determination of the value of the 'metallic standard' which in post-1821 Britain was officially gold. Nevertheless, it is apparent Tooke adhered to the positions of Ricardo (1821) and Senior (1840) that the normal value of gold (or silver) was in the long run determined as a scarce commodity by its 'cost of production'. In deference to the position of 'Mr. Senior, in one of his lectures on the value of money' Tooke wrote:

> ...it is the cost of production of the precious metals, and not their quantity, which constitutes their values, and determines the prices of commodities with reference to the cost of production of the latter measured in metallic value (Tooke 1844: 136).

It was the first of Nassau Senior's *Three Lectures on the Value of Money*, delivered at the University of Oxford in 1829 and subsequently published in 1840, which Tooke was referring to above. In these lectures Senior developed on Ricardo's theory of the determination of the value of gold (and silver) as a scarce commodity in order to examine the factors which regulated the value of money in an economy in which money values are normalised by a gold (or a silver) standard. Senior (1840: 30) showed that the value of gold (or silver) money 'does not depend *permanently* on the quantity of it possessed by a given community, or on the rapidity of its circulation' but rather depends on '*the cost of its production*' as measured in labour commanded. To illustrate this position Senior (1840: 32-40) set out a model in which it was assumed that there was a spectrum of gold (or silver) mines all of different natural fertility which were available for exploitation and in which labour was the only input employed in equal quantities in these mines. In equilibrium, when a uniform rate of profit was earned on capital and a uniform wage was paid to labour, the value of scarce gold (or silver) was determined by its cost of production at the least productive (no-rent) mine brought into use. In accordance with Ricardo's theory, rent went to those producers of gold (or silver) using mines whose productivity was higher relative to the least productive mine commanding a zero rent. The value of rent per mine (measured either in terms of gold, silver or in labour commanded) was determined by the difference between the cost of producing gold (or silver) at each mine and the cost of production at the no-rent (or marginal) mine. Highest at the most productive mine, rent was progressively lower at successively less productive mines down to the least productive mine employed in gold (or silver) production. On this basis, Senior came to the same conclusion as Ricardo that providing the 'cost of production' at the marginal mine remained unchanged, the value of gold (or silver) would be invariable to changes in output to satisfy its demand. This was consistent with the longstanding conception in classical economics that in the *long run* the quantity of gold used as money was endogenously determined by its value for a given level of aggregate output and a given velocity of circulation at the competitive equilibrium position of the economy (see Green, 1992: 14-15, 51 *et seq*.). The following two passages from Ricardo and Senior convey this conception:

> Gold and silver, like all other commodities, are valuable only in proportion to the quantity of labour necessary to produce them, and bring them to market. Gold is about fifteen times dearer than silver, not because there is a greater demand for it,

> nor because the supply of silver is fifteen times greater than that of gold, but solely because fifteen times the quantity of labour is necessary to procure a given quantity of it. ... The quantity of money that can be employed in a country must depend on its value: if gold alone were employed for the circulation of commodities, a quantity would be required, one fifteenth only of what would be necessary, if silver were made use of for the same purpose (Ricardo 1821: 352).

> The quantity wanted [for money] would depend partly on the cost of producing gold, and partly on the rapidity of circulation. The rapidity of circulation being given, it would depend on the cost of production. It is obvious that twice as much money would be required to effect every exchange, if a day's labour could obtain from [mining] 34 grains of gold, as would be necessary if a day's labour could obtain only 17. And the cost of production being given, the quantity of money would depend on the rapidity of its circulation (Senior 1840: 21).

Senior (1840) took the analysis a step further than Ricardo (1821) in examining how, on the one side, changes in the permanent demand for gold (or silver) and, on the other side, changes in the productivity of mines which could be profitably utilised, affected its cost of production and, thereby, the value of money. An account of this analysis by Senior (1840), which no doubt Tooke digested, is provided in the Appendix to this chapter. What, in particular, Senior (ibid: 76-7) showed is that the stability of the value of gold (or silver) and, thereby, given other things, the price level, depended largely on a gradual change in the productivity of mines. This was consistent with the position of Ricardo (1821: 14, 86-7) who believed that the relative stability in the value of the precious metals stemmed from their scarcity in the sense that new mining deposits were difficult to find. These two writers clearly believed that 'variability' in their value arose from factors which substantially altered productivity in the gold (or silver) mining industry: mainly consisting of the discovery of new and more fertile deposits, the introduction of improved methods of production and the resort to less fertile mines with the exhaustion of deposits at the best ones.

The opening quote of this section by Tooke indicates that he largely adopted the position of Senior (1840) that the value of the gold standard depended on its conditions of production in conjunction with its demand as a 'commodity'. It also indicates that Tooke adopted Senior's conception that through its influence on the demand for gold as money, the cost of production of gold exerted a systematic effect on the determination of the quantity of gold (coin) in monetary circulation. Further evidence of Tooke's adoption of this position is evident in the discussion in Chapter II of the *Inquiry* (1844) on the causal relation between the 'general' prices of commodities and the quantity of metallic money in circulation. Tooke begins this discussion by supposing that:

> ... the value of gold in the commercial world is assumed to be constant, i.e. that the cost of production and the general demand are unvaried (1844: 9).

This indicates that Tooke well understood the conditions set out by Senior (1840) for the stability of the value of the precious metals. Tooke (1844: 10-11) also embraced Senior's

argument that the use-value of the precious metals primarily stemmed from their non-monetary use as material in the production of luxury commodities out of which their use as money stemmed. He contended that a large proportion of the world's stock of gold was in fact used for non-monetary purposes:

> As this country is not only a large consumer of the precious metals for purposes other than money, but is also an entrepôt for receiving from the mines, and distributing the greater portion of the quantity applicable to the consumption of other countries, the bullion trade, totally independently of supplying currency, must of necessity be very considerable (Tooke 1844: 12-13).

Besides the demand for such non-monetary purposes, Tooke contended that a 'very considerable amount of the precious metals' (1844: 13-14) was held as bullion reserves by central banks for the purpose of meeting international debt payments. The function of the precious metals as a means of settling international payments was seen to spring from their 'universal demand' as commodities which Tooke linked to their being 'less liable to fluctuations in market value than any other[s]' (1844: 13).

Hence, at least by the time of his banking school phase Tooke had adopted the theoretical position of Senior as well as Ricardo on the determination of the 'normal' value of gold (or silver). Indeed, Senior's analysis is likely to have helped Tooke clarify his banking school monetary thought. However, later writings on the subject are not altogether consistent with this analysis. This is particularly so in Part VII of *History* (1857, VI) devoted to a study of the effect of the mid-nineteenth century gold discoveries in California and the East Australian colonies on prices over the period, 1848-1856. Though this Part of the book was written by Newmarch, it must be assumed Tooke endorsed its arguments. As is discussed in more detail in section 5.5 below, Tooke rejected the possibility that the employment of the newly discovered gold mines contributed to higher money prices on the grounds that they were no more productive than existing ones:

> It may be said that whatever may be the facts as concerns a fall in the Value of Gold, by reason of augmented *quantity*; there can at least be no question as to a fall in the value of Gold by means of a diminished *cost* of production of that metal; meaning by diminished Cost of Production, that since 1850, a larger amount of Gold than previously has been procured by the expenditure of the *same* amount of Labour and Capital (1857, VI: 225).

This amounted to arguing that the gold discoveries led to an increased production of gold without any accompanying rise in the productivity at the marginal mine. The difficulty with this argument arises from how there can be an increased production of gold in absence of a systematic reduction in its 'cost of production' which would induce an increase in its normal demand. The only plausible basis for consistency in this argument with the classical theory of the determination of the 'normal' value of gold (or silver) outlined above, is that Tooke believed the demand for gold to be unresponsive to changes in its value so that despite there being no reduction in its 'cost of production', nearly all

available mines (both existing and new ones) are profitably brought into production. That Tooke adopted this assumption may well be inferred from his view that '[G]old is an object in such universal demand, or in other words so universally marketable' that it 'may always command a market' (Tooke 1844: 10; also see 1857, VI: 216-18).[2] It means that providing there is no change in the productivity of the *marginal* (no-rent) mine, new gold discoveries or the exhaustion of existing mines will have no lasting affect on the value of the gold standard, and, thereby, on the general level of money prices. Any associated change in the productive capacity of the gold industry – either its augmentation with the discovery of new mining deposits or its contraction with the exhaustion of existing deposits – will result in a corresponding adjustment in the demand for its production. This was perhaps the implicit basis upon which Tooke and Newmarch (1857, VI: 225-6) dismissed the possibility that the discovery and exploitation of the Californian and the East Australian gold fields lowered the cost of production of gold. Indeed, this seems to be the position adopted by Tooke for precluding from his historical analysis factors which *directly* affected the conditions of production and the value of the precious metals from exerting a significant influence on the long-run level of money prices.

5.5 On the Effect of the Mid-Nineteenth Century Gold Discoveries

Post 1821 Britain's monetary values were fixed to the gold standard according to the official mint price of an ounce of gold. On the basis of this monetary standard, the money prices of commodities were determined by their exchange (or relative) value to gold; that is, by the gold price of commodities. Therefore, the price level depended heavily on factors which determined the value of gold. This was well understood by classical economists, and, as indicated in the previous section of this chapter, by Tooke. But despite Tooke recognising the importance of the value of gold in explaining price movements under a convertible system of currency, little of his writings are devoted to its analysis until volumes V and VI of *History* (1857). It appears the reason behind this omission was that Tooke found no *à priori* evidence for believing anything other than the value of gold remained relatively invariable from 1821 to the mid-nineteenth century. However, in 1848 Tooke believed the prospect of a progressive rise in the production of Russian gold mines was likely to alter its future value:

> There is, however, one other consideration which must not be lost sight of in any view to future prices; and that is the value of gold. I believe that the circumstances operating upon the supply of gold, relatively to the demand for it in the markets of the world, have been for many years past such as to preserve it *at a nearly constant value. At least there have been no indications, taking the ordinary tests, of any material variation*. But there are in prospect causes which may produce a considerable alteration. The most important of these is the extraordinary production of gold in Russia (1848, IV: 40; emphasis added; also see 1844: 12 n.1).

[2] Tooke did qualify this view by stating that while 'gold is a commodity in such general demand' which 'can always buy all other commodities ... other commodities cannot always buy gold' (1844: 10). This suggests some limit on the demand for gold as its exchange value rises in relation to other commodities.

Tooke argued that if the 'quantity of gold relatively to its uses should increase so as sensibly to affect its value', the lowering in its value will result in 'an increased price of corn, and of labour, and of commodities generally' (1848, IV: 41). If the 'production of silver should be comparatively stationary', Tooke argued that it will also result in 'an increased price of silver, and our par of exchange reduced with foreign countries whose standard is silver' (ibid.). An 'extraordinary' increase in gold production did in fact occur over the following decade as a result of gold discoveries in California and the East Australian colonies rather than any large growth in the output of Russian mines. The economic effects of the substantial increase in the world supply of gold which stemmed from these discoveries were the subject of detailed study by Tooke and Newmarch in Part VII of volume six of *History* (1857).

In this study Tooke and Newmarch (1857, VI: 145-54) estimated that as a result of the discoveries in the new world, increased production had added £174 millions to the value of the stock of gold over the period 1848 to 1856. This represented an approximate increase of twenty-seven per cent in the world's stock of gold. Tooke and Newmarch (1857, VI: 154-8) estimated that nearly all this additional gold was coined and put into monetary circulation. Indeed, Tooke and Newmarch (ibid.) ascertained that the demand for gold as money well exceeded its production over the relevant period, the deficit being largely satisfied by the conversion of existing plate into coin and the drawing out of gold from existing hoards.[3] This great increase in the stock of 'metallic money' was, according to Tooke and Newmarch (1857, V: 341-7; VI: 158-78), accompanied by a substantial trend rise in the general money prices of commodities and money wages. However, Tooke and Newmarch (1857, VI: 194-7, 225) rejected the orthodox 'doctrine' that the increase in the quantity of metallic money was the major cause of this persistent inflation in money prices. While they acknowledged that the increase in the supply of gold tended to reduce its exchange value this was more than offset by an increased demand for it stemming from an expansion in international trade and production:

> ... the increase of Trade, Enterprise, and Production have, during the last Eight or Nine years, counteracted almost entirely the apparent *à priori* tendency of the New Supplies to depreciate Gold as compared with Silver and other Commodities, – in other words, to raise the Prices – as stated in Gold – of all Commodities (Tooke and Newmarch 1857, VI: 197).

Tooke and Newmarch (1857, VI, 193-218) argued that the gold discoveries raised the price level through a *process* by which increased supplies of gold stimulated an expansion in international income and expenditure. This involved the 'diffusion' of gold from regions of production to the international economy as payment for imported goods or as remittances for foreign capital investment. Non-producing countries absorbed the additional supply of gold according to their relative export performance and balance of payments positions. Relying on the views of Senior (1830 Lect. I) and J.S.Mill (1871

[3] Tooke and Newmarch (1857, VI: 154-5, 158) calculated that from 1849 to 1856 'total gold coinage' in England, France and the United States was £202 millions, adding about 30 per cent to the stock of gold in world monetary circulation.

[1848]: 619-28), Tooke and Newmarch (1857, VI: 205-210) argued that the distribution of the precious metals among countries in the international economy ultimately depended on the relative productivity of their industries. Hence, a greater proportion of the additional supply of bullion was absorbed by the United Kingdom because of the superior skill and efficiency of its industry and the superior quality of its exports which caused them to be in high demand abroad.[4] Tooke and Newmarch (1857, VI: 210-12) maintained that in the first instance, the greater part of increased gold went to England, whose exports were in the greatest demand in California and the Australian colonies, from which it was 'conveyed to other parts of the world' through international payments on its imports. Importantly, this process was seen by Tooke and Newmarch to generate rising incomes and expenditures in the commercial world by which gold was absorbed by demand into the monetary circulation of countries.

In Tooke and Newmarch's explanation of the economic impact of the mid-nineteenth century gold discoveries, there were two main ways in which the increased supply of gold was seen to have stimulated higher levels of expenditure and production in the world. Firstly, an exogenous increase in the export demand of the gold-producing regions provided a stimulus to industry in Britain as well as North-East America and Western Europe. In this connection Tooke and Newmarch (1857, VI: 219-21) ascertained that the 'opening out of new fields of enterprise' in these regions, in particular, for investment in railways and the telegraph, was an important source of stimulus for additional expenditure. It also opened up new markets for trade, especially in the American West. Secondly, they argued that the increased supply of gold bullion facilitated an expansion in international trade and capital investment which was the driving force of rising 'real wealth'. An important aspect of this argument was that together with freer trade, large-scale British investment in railways and other communications infrastructure in Europe, North America and India provided new sources of raw materials and export markets for an expansion in international trade over the period 1848-1856. Essentially Tooke and Newmarch (1857, VI: 220-23) were of the view that this economic development was assisted by the availability of larger gold reserves to 'national' banks, enabling a greater volume of international transactions to be expedited than would have otherwise been possible given the constraint of maintaining a 'safe' minimum reserve to ensure convertibility of its paper currency. In relation to Bank of England policy, Tooke and Newmarch (1857, V: var. 561-98; VI: 200-204) contended that higher reserves accommodated by the increased supply of gold afforded lower rates of interest (the discount rate) than would have otherwise occurred (On this issue, see chapter 7.6 below: xx). By way of summarising the argument, they appealed to Adam Smith's well known analogy, likening the monetary function of the stock of gold in the international economy to the function of a highway:

[4] Quoting from Mill (1871 [1848]: 609), Tooke and Newmarch wrote:

> ... the United Kingdom has been in a pre-eminent degree the country whose Exportable Goods (native, or obtained elsewhere) have been 'most in demand abroad, – have contained the greatest value in the smallest bulk, – and have been (practically) the nearest to the Mining;' and therefore, that by far the largest proportion of the New Gold has been sent to this country (1857, VI: 210).

> A Highway facilitates and encourages traffic; and the broader, smoother, and longer it is, the greater its efficacy as an instrument or machine conducive to production (Tooke and Newmarch 1857, VI: 216).[5]

In these ways Tooke and Newmarch believed that the mid-nineteenth-century gold discoveries contributed to higher levels of income and expenditure in Britain, through which it tended to raise money prices in general. Hence, according to Tooke and Newmarch (1857, VI: 224-5), it was by manner of its causal role in 'the gradual growth of a larger demand' that the gold discoveries contributed to the higher level of prices.

A feature of the Tooke and Newmarch's explanation is that the rise in the level of money prices was attributed to factors which acted directly on commodities other than gold: raising their prices (and wages) *relative* to the gold standard. What is interesting about this explanation, which Jevons (1863: 15-16) noticed, is that Tooke and Newmarch rejected the possibility that the gold discoveries led to a reduction in the 'cost of production' of gold:

> Now there is good reason to believe that this supposition of a diminished Cost of Gold since 1850, is almost wholly erroneous. It might be shown very clearly, that combining together the extent, and cost, of the agency which has been employed to raise the 174 Millions of New Gold from the soil; the large army of Labourers and persons dependent upon them; the expenses of conveying those Labourers to the distant regions of the Gold Diggings; the expense of Tools; the cost of Living; and the value of the commodities with which the Gold has been purchased of the Diggers; – and placing this combined Total of outlay against the quantity of Gold produced, it would appear that the operation, as a question of investment to be tested by mere figures of profit and loss, has been strikingly unsuccessful. It would appear, in other words, that the amount of Labour and Capital which has been expended in producing Gold; might have been expended to greater advantage in producing commodities; – *provided* that such commodities could have found as ready and brisk a market as has been found by the Gold (1857, VI: 226).

Thus, Tooke and Newmarch ascertained that the new gold fields of California and Eastern Australia were no more productive per unit of inputs than pre-existing deposits so that the 'large addition [to the world's stock of gold] took place without affecting in any way that can be discovered the relative value of Gold' (1857, VI: 232).[6] However, this

---

[5] However, with a distinctly 'mercantilist' tone, this analogy was taken a step further by Tooke and Newmarch than Adam Smith would have ever contemplated:

> ... if these illustrations have any force, it follows that, during some period, longer or shorter, an addition to the quantity of money is the same thing as an addition to the Fixed Capital of the country; and exerts on production an influence of the same kind as the provision of improved harbours, roads, or manufactories (1857, VI: 216).

[6] The possibility of a reduction in the cost of production of gold was considered to depend on the employment of improved methods of mining:

view is not very plausible since it is inconceivable that there would have been sustained investment in these regions without the realistic prospect of earning higher rates of return offered by more productive gold mines. Indeed, *à priori* evidence for the relatively higher fertility of the newly discovered gold mining regions is provided by their meteoric rise in production which, as Tooke and Newmarch (1857, VI: 145-54) calculated, added more than twenty-five per cent to the world stock of gold in the short period between 1848 and 1856. Subsequent studies by Jevons (1863: 1869), Giffen (1886) and Soetbeer (1888: 159-63) as well as the 'Final Report' of the Gold and Silver Commission (1888: 9-11, 69) supported the argument that the gold discoveries *directly* induced a reduction in the value of gold (measured against silver). These studies tended to employ a marginalist approach, explaining the decline in the value of gold *by virtue* of an increased supply of gold in relation to its demand. From the standpoint of the classical approach, it is difficult to conceive how the additional output of gold was absorbed into monetary circulation in absence of a prior causal reduction in its cost of production which directly raised the general price level. In all plausibility it would involve *a process* in which the discovery of the more fertile gold mines of Eastern Australia and California at the pre-existing worldwide demand for gold would, at least initially, bring about a significant reduction in the cost of production at the *new* least productive mine that supplants the *old* but now unprofitable one. The reduction in the value of the gold would, as the monetary standard, lead directly to an increase in the general level of money prices worldwide which, in turn, will tend to cause an increase in the demand for money and, thereby, the worldwide demand for gold for monetary circulation. If, over time, the demand for gold should increase to a level at which the least productive mine profitably employed is the *old* one, then the pre-existing cost of production of gold will be restored. Indeed, this appears to be what Tooke and Newmarch believe would occur. As previously discussed in chapter 3.5 (refer xx), they seem to have adopted the position that because gold was 'universally marketable' its demand would increase to absorb the higher output of a gold industry with an enlarged productive capacity. However, this reasoning lacks plausibility in the classical approach to value in absence of the foregoing causal process by which the cost of production of gold declines as a result of the discovery of more fertile mines. Indeed, the analysis of Senior (1840: 52-5; refer to ch. 3.5 above: **xx**) showed that the discovery of new mines could only plausibly induce an increased demand for gold as money if it brought about a reduction in the 'cost of production' of gold. While the economic forces which Tooke and Newmarch (1857, VI: 204-13, 218-23) identified as raising levels of income are likely to have contributed toward increasing the monetary demand for gold, the most important single factor was surely a permanent lowering in the value of the gold standard (relative to other commodities) which, thereby, caused a trend rise in the general price level. By contrast, Tooke and Newmarch (1857, V: 341-7) largely explained the rise

---

> We have now arrived, perhaps, at a point when the successful application of Machinery to the crushing of Quartz Rock may sooner or later effectually reduce the cost of producing Gold. It is quite possible that the Reduced Cost, and the increasing Quantity – for money produces its effects by means of volume as well as cost - may proceed more rapidly than the absorption of Gold in new countries, and by augmented dealings; – and so raise the range of General Prices (Tooke and Newmarch 1857, VI: 227).

in the price level in the decade after the gold discoveries by reference to demand factors which increased the cost of production *of commodities other than gold* in relation to gold.

Overall, then, the explanation of the effect of the gold discoveries on the price level in Tooke and Newmarch (1857, VI: 213- 29) is not altogether convincing. It is also not altogether consistent with Tooke's banking school position. Perhaps this analytical shortcoming reflected the influence of the principal author of the explanation, Newmarch, who had a tendency to emphasise the causal role of demand in the movement of prices.[7] But it also suggests that Tooke himself did not fully grasp the classical approach to explaining the long-run value of money in an economy such as Britain with a gold standard. As already discussed in chapter 3.4 above, following Ricardo (1823: 85-7, 193) this approach was most clearly outlined by Senior (1840) and read but apparently not completely understood by Tooke.

References

Giffen, R. (1886) 'The Depreciation of Gold since 1848', in *Essays in Finance*: *First Series*, 4th edn., London, George Bell and Sons.

Gold and Silver Commission (1988) 'Final Report of the Royal Commission Appointed to Inquire into the Recent Changes in the Relative Prices of the Precious Metals with Minutes of Evidence and Appendixes', c.5512

Green, R. (1992) *Classical Theories of Money, Output and Inflation: A Study in Historical Economics*, London, St. Martins Press

Jevons, S. (1863) *A Serious Fall in the Value of Gold Ascertained, and its social effects set forth*, reprinted in *Investigations in Currrency and Finance*, edited by H.S. Foxwell, London, MacMillan, 1884, 12-118.

Jevons, S. (1869) 'The Depreciation of Gold', Journal of the Royal Statistical Society, vol. XXXII, Dec., 445-9, reprinted in *Investigations in Currrency and Finance*, edited by H.S. Foxwell, London, MacMillan, 1884, 151-9.

Mill, J.S. (1871 [1848]) *Principles of Political Economy; with some of their applications to social philosophy*, 7th edn., edited with an introduction by W.Ashley, New Jersey, Augustus M. Kelly, reprint, 1987

Newmarch, W. (1853) *The New Supplies of Gold: Facts and Statements, relative to their Actual Amount; and their Present and Probable Effects*, revised edition with five additional chapters, London, Pelham Richardson

[7] Recall that Part VII of *History* (VI: 135-236), devoted to explaining the economic effects on Britain of the mid-nineteenth century gold discoveries, was based heavily on Newmarch's work, *The New Supplies of Gold* (1853).

Ricardo, D. (1821) *On the Principles of Political Economy and Taxation*, 3rd edn., *The Works and Correspondence of David Ricardo*, vol. I, edited by P. Sraffa with the collaboration of M.H. Dobb, published for the Royal Economic Society, Cambridge University Press, 1951

Senior, N. (1830) *Three Lectures on the Cost of Obtaining Money, and on some effects of Private and Government Paper Money*, delivered before the University of Oxford in Trinity Term, 1829, in *Selected Writings on Economics : A Volume of Pamphlets 1927-1852*, New York, Augustus M. Kelley, reprint, 1966

Senior, N. (1840) *Three Lectures on the Value of Money*, delivered before the University of Oxford in 1829, in *Selected Essays on Economics: A Volume of Pamphlets 1927-1852,* New York, Augustus M. Kelley, reprint, 1966

Soetbeer, A.D. (1888) *Materials for the Illustration and Criticism of the Economic Relations of the Precious Metals and of the Currency Question*, 2nd edn., translated from the German and published as Appendix XVI to the Final Report of the Gold and Silver Commission, c.5512-1,139-244

Tooke, T. (1823) *Thoughts and Details of High and Low Prices of the Last Thirty Years, in Four Parts*, (with Part i published in January and Parts ii-iv in July), London, John Murray (Pts. i-iv)

Tooke, T. (1844) *An Inquiry into the Currency Principle : the connexion of the currency with prices and the expediency of a separation of issue from banking*, 2nd edn. (May), in *Series of Reprints of Scarce Works on Political Economy* No. 15, The London School of Economics and Political Science, reprint, 1959.

Tooke, T. and Newmarch, W. (1857) *A History of Prices and of the State of the Circulation, during the Nine Years 1848-1856*, vols. V and VI, London, P.S. King and Son., reprint, 1928.