

Joseph Shield Nicholson (1850-1927): An early student of Marshall at Cambridge, later quite critical of Marshall and his Economics

Peter Groenewegen
University of Sydney

Abstract: Joseph Shield Nicholson (1850-1927) in 1876 graduated with first class honours in the Moral Sciences at Cambridge, where he was taught economics by Sidgwick and Marshall. He was appointed Professor of Political Economy at Edinburgh University in 1880, a position he continued to hold until 1925. During his life time as an academic he wrote over a dozen books and a substantial number of articles in the emerging economic journals. This paper examines a sample of Nicholson's work: his essay on machinery and labour (1878, 1892), his *Treatise of Money and Essays on Monetary Problems* (1888, 1895) and his *Principles of Political Economy* in three volumes (1893, 1897, 1901), for their Marshallian characteristics as indicated by references to Marshall's work. This part of the paper is preceded by an introduction and biographical sketch of Nicholson, and concludes, among other things, that the association between the two deteriorated as they grew older, and virtually disappeared over the final two decades of their lives. The paper forms part of my project on 'minor Marshallians' in progress from the start of the decade.

Joseph Shield Nicholson studied political economy at Cambridge with Marshall while taking the Moral Sciences Tripos. In the final examinations in 1876 he was equal second in the first class honours list, an excellent result. Nicholson was therefore one of Marshall's early students, and was described by Marshall in an undated fragment (probably from around his retirement in 1908) as one of the many persons sent from Cambridge who had become a 'leading teacher' of Economics at London University and, though not mentioned by Marshall on this occasion, at Edinburgh (cited in Groenewegen 1995, pp. 753-4). Nicholson's Cambridge studies, it may be added, followed his philosophical studies (Logic and Metaphysics) at King's College, London, and a year's further study at Edinburgh, and were in turn followed by legal studies at Heidelberg.

However, Nicholson basically studied his Political Economy at Cambridge, where Marshall and Sidgwick were his main teachers (Rutherford, 2004, p. 854).

In 1877, Nicholson won the Cambridge Cobden Club's Essay Competition with the contribution, *The Effects of Machinery on Wages*, the first edition of which was published in 1878, the second in 1892 (Nicholson, 1892). John Neville Keynes, who had also entered the competition as one of Marshall's early students, came second. In 1878 Nicholson completed an M.A. at the University of London, winning the Gerstenberg Prize for Political Economy. Following his successful completion of the Moral Sciences Tripos, Nicholson earned his living at Cambridge by private tutoring for the next four years. In 1880, he successfully applied for the Chair of Law and Political Economy at Edinburgh University.

Marshall appears to have had reasonable collegial relations with Nicholson, inviting him to his home for dinner on at least several occasions. Moreover, over the decades following Nicholson's appointment at Edinburgh, they cooperated on general economists' issues in a very collegial manner. These included signing the 1903 Free Trade Manifesto, organised by Edgeworth, Bastable and Nicholson (Marshall to Brentano, 18 August 1903, in Whitaker 1996, III p. 53); supporting the establishment of a British Economic Association (later Royal Economic Society) and its *Economic Journal* (in which both also published a number of articles); and the introduction of the new Cambridge Economics and Political Sciences Tripos as a way of encouraging greater specialisation in the study of economics, while Nicholson for a number of years served his former university as an official examiner in the Moral Sciences Tripos.

Marshall and Nicholson also exchanged books. For example, Nicholson sent Marshall a copy of his prize-winning Cobden Club Essay in 1878, while Marshall sent Nicholson a copy of his *Elements of the Economics of Industry* in 1892 (Groenewegen 1995, pp. 427n.). However, they frequently criticised each other as well. Marshall, for example, thought little of Nicholson's monetary contributions including the material he had submitted in evidence to the Gold and Silver Commission (see Marshall 1888, in

Groenewegen 1996, pp. 65-80). Marshall was somewhat dubious of Nicholson's article on 'human capital' for the 1891 *Economic Journal* (Marshall to F.Y. Edgeworth, 4 April 1891, in Whitaker 1996 II p. 28). Furthermore, Marshall criticised Nicholson's misunderstanding of the notion of consumer surplus on several occasions (Marshall to E.R.A. Seligman, 13 May 1900, in Whitaker II 1996, p. 279), as well as Nicholson's misinterpretation of his concept of quasi rent (Marshall to N.G. Pierson, 30 April 1898, in Whitaker II , p. 230). In 1904, Marshall strongly disagreed with Nicholson as an examiner for the Cobden Club Prize Essay competition in that year, who had placed Lâl's essay above MacGregor's entry in a 'strictly confidential' letter to Tanner. According to Marshall, MacGregor's study of the coal industry was far superior, and Nicholson had ranked Lâl's highly only for the quality of its English expression (Marshall to Tanner, 9 December 1904, in Whitaker 1996, III p. 98).

More generally, Marshall wrote John Neville Keynes (6 February 1902, in Whitaker 1996 II p. 353) *à propos* Nicholson, that Marshall had never complained that [J.S. Nicholson] had studied theory too much, 'my increasing complaint is that he has not studied it enough'. On another occasion, Marshall (letter to H.S. Foxwell, 2 August 1903, in Whitaker 1996, III pp. 42-3) described Nicholson's work as 'intellectually slovenly' on virtually every page of his books, and that he was completely incapable of describing Nicholson 'as a man of high calibre' in economics.

Nicholson was equally critical of Marshall on occasions. In his review of Marshall's *Principles* for the *Scotsman* (in Groenewegen, 1998, I pp. 166-68), he strongly criticised much of the historical material in the book. Stronger criticism was reserved for private correspondence with friends such as John Neville Keynes, who recorded Nicholson's comment in his diary:

On re-reading the review, I think, I let him off too easily on some things. His history is vague, old-fashioned, and excessively weak; his examples are mainly of the old a priori kind or at best curious rather than important; the repetition is so great that his plan must be faulty; but if he is to cover the whole ground of what I

understand by P.E., he will at the same rate take six volumes. At the same time his pure theory is extremely good and deserves the highest praise, especially because he was really the first to introduce the ideas to England. The book, however, will never do as a textbook in its present shape, and I can only recommend it for honours students (J.N. Keynes, Diary, 24 July 1890, cited in Groenewegen 1995, p. 416.)

It may also be suggested that Marshall was probably highly annoyed over the fact that by 1901 Nicholson had managed to publish the third and final volume of his *Principles of Political Economy* (the first volume having appeared in 1893, the second in 1897), while he at that time was making no head-way whatsoever with the second volume of his *Principles*. Be that as it may. The final falling out between Marshall and Nicholson occurred in 1908 over Pigou's appointment as Marshall's successor to the Cambridge economics chair, instead of Foxwell. At the 'celebratory dinner' for Pigou's success at Balliol Croft the evening following the selection committee meeting, Nicholson later reported that 'Marshall did not speak to him the whole evening' because he had voted for Foxwell. In addition, Foxwell himself reported in a letter to Clara Collet, that on the following day Nicholson 'paced up and down my garden for two hours abusing Marshall' (cited in Groenewegen 1995, pp. 623-4). Correspondence between Marshall and Nicholson seems to have ceased after this, though in 1922 Nicholson did sign the congratulatory economists' letter to Marshall on the occasion of his eightieth birthday. Their relationship was, therefore, often on the stormy side, and they happily criticised each other over their academic life time.

In the remainder of this paper, Nicholson's use of Marshall's ideas in some of his work, is discussed in detail. This is done by seriatum assessment of Marshall's possible influence on Nicholson's Cobden Club Prize Essay on wages and machinery (Section II), then on his monetary writings (Section III) and finally on the three volumes of Nicholson's *Principles of Political Economy* (Section IV). Where possible, these sections will also assess Marshall's reactions to Nicholson's writings. Section I, by way of introduction, provides a brief biographical sketch of Nicholson, with special reference to his association with Marshall; Section V presents some conclusions.

I

Nicholson was born at Wrawby, Lincolnshire, on 9 November 1850. He was the son of an independent minister, and was educated at congregational schools. He matriculated and graduated at King's College, London University, with an honours B.A. in Logic and Metaphysics. He then studied for a year at Edinburgh University (1872-73), before entering Trinity College, Cambridge, as a student in the Moral Sciences. In 1876, he was second in the first class honours list (a position shared with a man called Ryland). The previous year, in the context of the 1875 Tripos examinations, Marshall wrote Foxwell that Nicholson was examined at Trinity and had been bracketed second with Jacobs in the Part I examination for the Moral Sciences Tripos (Marshall to Foxwell, 9 April 1875, in Whitaker 1996, I pp. 35-6 and n.9).

In 1877 Nicholson won the Cambridge Cobden Club Essay Prize for his essay, 'The Effects of Machinery on Wages; he also passed the London M.A. winning the Gerstenberg Prize. He then studied Law at Heidelberg, and became fluent in both German and French. The three novels he wrote at this time were not very successful. Successively, they included *Thoth, a Romance* (1888), *A Dreamer of Dreams* (1889) *Toxar, A Romance* (1890). In 1913, he wrote *Orlando Furioso: Tales from Ariosto*, which went through various editions.

Nicholson was appointed Professor of Political Economy and Mercantile Law at Edinburgh in 1880 (aged thirty), a position he held until his retirement. He expanded his Department with additional lecturers and established an honours degree in 1890. In 1885, Nicholson married the daughter of his predecessor, W.B. Hodgson. From the marriage came three children: a boy who died during the First World War, and two daughters.

Nicholson was a very prolific author. His first book was an edition of Smith's *Wealth of Nations*, a clear sign, as Scott (1927, p. 496) indicated in Nicholson's obituary,

of his great love and admiration of Adam Smith, the major influence on his work and of whom he was ‘a linear successor’ in the full sense of this term (Scott 1927, p. 497). Nicholson’s aims in this edition were to defend Smith from his contemporary critics who all too frequently failed to understand him, and to stress his continuing relevance. Nicholson therefore not surprisingly used Smith’s *Wealth of Nations* and J.S. Mill’s *Principles* as his major texts, supplemented by more contemporary reading. These books are also the major sources for Nicholson’s three volume *Principles of Political Economy*, though its prefaces also thank Marshall and Sidgwick as his teachers of Political Economy at Cambridge, and J.N. Keynes (in all three volumes) for correcting the proofs. Marshall was fairly frequently cited in the first volume, considerably less in the second and the third, a citation practice partly explicable by the contents of the specific volumes. In the context of Nicholson’s teaching, it may be added that Scott (1927, p. 496) depicted Nicholson as an old-fashioned Scottish academic: a thorough teacher, who was completely devoted to his students during the winter months, but who worked exclusively on his research during the warmer months of April to September.

Given this research strategy, it is not surprising that Nicholson published much additional material in book form. Apart from his Cobden Club Essay on Wages and Machinery, these include a *Treatise of Money and Essays on Monetary Problems* in 1888 (third edition 1895, fifth and final edition, 1901); *Strikes and Social Problems* (1896); *The Tariff Question with special reference to Wages and Employment* (1903); *A History of the English Corn Laws* (1904); *A Project of Empire: A Critical Study of the Economics of Imperialism, with special reference to the Ideas of Adam Smith* (1909); *War Finance* (1918); *Inflation* (1919) and, his final book, *The Revival of Marxism* (1920). As indicated in the introduction, only three of these books are assessed in more detail, that is, the Prize winning Cobden Club Essay on wages and machinery, the *Treatise* and essays on monetary topics, and the three volumes of his *Principles of Political Economy*.

For the first volume of the *Palgrave Dictionary of Political Economy*, which appeared in 1894, Nicholson contributed seventeen entries. These commenced with the entry on ‘Abolition [of slavery]’ and concluded with that on ‘Credit’. Nicholson wrote only one

entry, that on his by then deceased father-in-law, W.B. Hodgson, for the second volume (1896, II pp. 317-18). He contributed no entries to the third and final volume of this important reference work. During the late 1880s, Nicholson also produced five articles for the ninth edition of the *Encyclopaedia Britannica*, on ‘Taxation’, ‘Usury’, ‘Value’, ‘Wages’ and ‘Wealth’.

In 1893, Nicholson was President of Section F (Political Economy) of the British Association for the Advancement of Science, giving his Presidential Address on ‘The Reaction in Favour of the Classical Economy’ at its meeting in Nottingham in September 1893 (Nicholson 1893, 1962 pp. 112-25), an address largely devoted to praising the continuing relevance of Adam Smith, and to criticism of some aspects of mathematical economics.

Nicholson also contributed extensively to the burgeoning academic journal literature. In total, nineteen academic articles appeared between 1887 and 1920: three in the *Journal of the Royal Statistical Society* (in 1887 and 1893); two in the *Journal of Political Economy* (both in 1893) and the other fourteen in the *Economic Journal*. The topics covered by these articles varied widely. Three were devoted to measurement problems of the various monetary standards and two, published during World War I, to problems of inflation including its measurement. Two articles concerned capital: one discussed the issue of ‘human capital’, considered by some to have been Nicholson’s major contribution to economics; the other capital in its relation to labour. Nicholson contributed two articles on classical political economy, and one on Adam Smith’s position on the public debt. Nicholson also published a piece on the economics of imperialism, and three on the work of individual economists: Friedrich List, Walter Bagehot and John Law. Of the remaining four articles, one was an address given by Nicholson to the inaugural meeting of the Scottish Society of Economists which had taken place on 9 November, 1897; one was on Scottish banking; of the final two, one was critical of Marshall, and one examined the use, and abuse, of authority in economics.

The paper critical of Marshall, published in 1894, questioned his analysis of consumers' surplus as a device for measuring value (utility) with money. Nicholson argued first that competitive market prices were applicable to all market participants in equal measure, whereas the degree of utility for individuals compatible with these market prices were, generally speaking, quite different. Total utility of a commodity, Nicholson (1894, p. 345) also maintained, was not measurable. Nicholson also argued that 'necessities' could not be given a finite marginal utility, mentioning here in particular the commodity, coal, which in the first edition of the *Principles of Economics* Marshall initially had used as an example in this context (Marshall 1890, Book III chapter IV; 1891, Book III chapter VI). It was this use of coal that Nicholson particularly objected to in the estimates of consumers' rent (later consumers' surplus) Marshall presented. As far as Nicholson (1894, pp. 346-7) was concerned, applying a utility measurement to coal was impossible, given its place as a vital necessity in a household budget. By the 1895 third edition, Marshall had changed the nature of his example: coal was abandoned, the commodity 'tea', (then much less of a necessity) was its replacement. As already indicated, Marshall had complained to Seligman in 1900 about Nicholson's misinterpretation of consumer surplus, an issue Marshall had tried to explain even more fully in the fourth edition of his *Principles* (Marshall 1898, pp. 202n, 207n, 257n). Nicholson, however, maintained his criticism of consumer surplus in the two editions of both the first and second volumes of his *Principles of Political Economy*.

The second paper, published in 1903, investigated the 'use and abuse of authority in economics', an investigation which twice mentioned Marshall. The first reference to Marshall related to his depiction of Adam Smith as 'the first [person] to make a careful and systematic inquiry into the way in which value measured the desires of purchasers to possess wealth on the one side and on the other the efforts and sacrifices of production', thereby making him a leading authority in economics (Nicholson 1903, p. 560). Secondly, Marshall was mentioned for his 'guarded statement' warning of the limitations of mathematical economics, a matter on which he had been preceded by Cournot, another leading mathematical economists conscious of the dangers of mathematical argument for explaining parts of the science of economics (Nicholson 1903, p. 565).

It may be noted here, and will be re-iterated in Section III below, that some of the monetary essays published in his book on money (1888, 1895) covered topics dealt with in these journal articles, more specifically those dealing with monetary standards, with John Law, with inflation and with problems and advantages of bi-metallism. In the context of bi-metallism it may also be mentioned that Friedman (1990, p. 96) described Nicholson ‘as one of the ablest British economists in favour of bi-metallism’, the type of praise assigned more generally to his monetary economics by Schumpeter (1954, pp. 1076, 1081). Nor should it be forgotten that especially during the 1880s, that is, prior to the commencement of specialist economics journal literature, Nicholson published many essays in non-academic journals, and read papers to learned societies, of which his 1893 Presidential Address to Section F of the British Association for the Advancement of Science has already been mentioned.

Nicholson resigned his Edinburgh chair in 1925 due to illness. He had held it for 45 years. He died less than two years later, on 12 March 1927.

II

Nicholson’s first book on economics, published two years after his completion of studies for the Moral Sciences Tripos, was his prize winning Cambridge Cobden Prize Essay on *The Effects of Machinery on Wages*. Nicholson (1892, p. ix) recorded that the first edition owed much to writers of the historical school, in particular to Thorold Rogers and Cliffe Leslie and, from Germany, to work by Held, Knies, Roscher, Nasse and Brentano. The first edition did not draw on Marshall’s work, which was not mentioned in this edition. Moreover, Marshall was assisting John Neville Keynes in preparing his entry for the Cobden Prize. Keynes had preceded Nicholson in the Moral Sciences Tripos by one year (being Senior Morallist in 1875). Marshall’s assistance to Keynes meant that Keynes treated the topic in a more abstract Ricardian and Marshallian manner. This was a distinct disadvantage when Cliffe Leslie was the external examiner for the prize, and ‘obviously destined to dominate’ the two internal examiners: Henry Fawcett, then Professor of Economics at Cambridge, and Samuel Phear, a theologian (Deane 2001, pp.

36-37). Nicholson's historical approach to the topic, based very much on that of Cliffe Leslie, was not surprisingly favoured by the external examiner as against that of Keynes, whose theoretical approach conflicted with Cliffe Leslie's historical method of economic investigation.

The structure of Nicholson's prize-winning essay in the first edition was an introduction, followed by five substantive chapters, and concluding with a summary of results. These chapters each concentrated on one of the five different aspects of the relationship between machinery and labour identified by Nicholson. These were substitution of machinery for labour (Chapter I), machinery as auxiliary to labour (Chapter II), machinery as affecting the division of labour (Chapter III), machinery as affecting the concentration of labour and capital (Chapter IV) and machinery as affecting the mobility of capital and labour (Chapter V). Contents and structure were not basically altered for the second edition in 1892. That edition, as Nicholson explained in the preface, had only been updated from the availability of 'new facts', wherever possible, and by references to more recent authorities. In addition, the second edition provided translations of quotations from foreign writers, while technical terms used in the *Essay* were more fully explained. Among the new authorities for Nicholson's second edition was Marshall, in particular the 1891 second edition of his *Principles*, a work which was quoted by Nicholson on no less than half a dozen occasions.

The first reference to Marshall, perhaps also in the first edition, is in a note on the 'wages –fund theory', a theory which had been strongly criticised 'from the deductive side.... by Professors Sidgwick and Marshall' (Nicholson 1892, p. 5 n.1). A quotation from Cournot (Nicholson 1892, p. 15) leads to the second note on Marshall, who had 'followed Cournot's example both as regards "money" and "continuity".' (Nicholson 1892, p. 16 n.1). Four pages later, the first volume of Marshall's *Principles* is strongly recommended on the topic of the effectiveness of individual wage bargaining as against collective wage-bargaining by trade unions (Nicholson 1892, p. 20, n.1). On p.33 n.1, Nicholson (incorrectly) suggested that Marshall had obtained his motto for the *Principles*, *natura non facit saltum*, from Cournot's *Revue sommaire des doctrines oeconomiques*

(for example, Cournot 1877, 1982, p. 99) though it should be noted that the 1927 *Marshall Library Catalogue* does not indicate that Marshall had owned a copy of this book in his personal library. Nicholson (1892, p. 36 n.2) quoted Marshall on the fact that the Swiss watch industry was ‘yielding ground’ to the American system (Marshall 1891, p. 316). Subsequently, Nicholson (1892, p. 86) cited Marshall’s *Principles* (Marshall 1891, p. 335) for reporting the employment characteristics of labour by industry, while a few pages later (Nicholson 1892, p. 89), Marshall (1891, p. 315) is quoted on repairs of machinery as undertaken by their owners. Nicholson (1892, p. 92) finally cited Marshall (1891, pp. 268-70) on the improvements of technical education which had taken place in England during the years after 1878, the publication year of Nicholson’s first edition. It can be agreed with Nicholson’s view that these references to Marshall’s work are on the factual side, with the exception of the first reference to the ‘deductivist’ critique of the wages-fund doctrine. Moreover, Marshall’s *Principles of Economics*, in its latest available edition, the second edition of 1891, was obviously a new authority in economics of the highest rank.

How do these Marshall references compare in the second edition to other references to the English literature made by Nicholson. Of the close to thirty British writers referred to by Nicholson, John Stuart Mill and Adam Smith are the most frequently cited with eleven and nine citations respectively. The statistician George Porter comes next, with five citations; he is followed by Charles Babbage with four; next come Jevons and Ricardo, both cited three times; and Henry Maine, Thorold Rogers and John Ruskin, each cited on two occasions. The sixteen English writing economists mentioned only once range from Walter Bagehot to Arthur Young, include Cambridge economists Foxwell and J.N. Keynes, and historical economists Richard Jones and Cliffe Leslie. Marshall’s *Principles*, therefore, ranked third in terms of citations behind the two other major treatise writers and important influences on Nicholson’s work, John Stuart Mill and Adam Smith.

Quite a number of Marshall ‘favourites’ were used by Nicholson in writing this book. Of these, Nicholson’s references to Cournot and von Thünen (Nicholson 1892, pp.

15, 22 and n., 33n) may be noted first. Nicholson's one mention of von Thünen concerned his analysis of the natural wage, even if Nicholson seemed to have been rather skeptical of its analytical value. Other favourites of Marshall, who would have featured in Marshall's Cambridge Political Economy Lecture Courses until the mid-1870s were Henry Maine, cited twice by Nicholson (1892, pp. 139, 141) and the philosopher Herbert Spencer, cited by Nicholson (1892, p. 134) as a person who applied the concept of 'the survival of the fittest... to bring about the best [social] state possible'. The texts underlying Marshall's political economy teaching experienced by Nicholson from 1874 to 1876 probably influenced him particularly strongly when he was writing his first monograph within a year of graduation. It is interesting to observe in this context that the 1927 Marshall Library Catalogue only includes the second 1892 edition, and that the 1878 first edition, with which Nicholson had presented Marshall that year, was by then no longer preserved among Marshall's books.

Nicholson's first book on economics, written as a recent graduate in the Moral Sciences, in its second edition demonstrated a reasonable indebtedness to Marshall's *Principles of Economics* largely as a source of new facts of relevance to Nicholson's topic. The first edition, the contents of which were largely reproduced in the second edition, owed little directly to Marshall. As mentioned in the previous paragraph, however, Nicholson more than likely gained an awareness of some of his sources, in particular Cournot and von Thünen, but perhaps also Henry Maine and Herbert Spencer, to Marshall's teaching of Political Economy at Cambridge in the early 1870s (see Groenewegen 1995, pp. 125, 129 for the importance of these authors to Marshall's early teaching). Moreover, Nicholson appears also to have gained his knowledge of the analytical errors in the wages-fund doctrine from the 'deductionist' critique thereof by Sidgwick and Marshall, implying that Marshall shared his influence on Nicholson with Sidgwick as his fellow economic teacher. In short, for the Cobden Prize Essay *The Effects of Machinery on Wages*, Marshall was one of many sources. As measured by the number of citations in the second edition, he had become a quite important one even if not as influential as Adam Smith and John Stuart Mill. Moreover, Marshall's Political Economy teaching, from which Nicholson undoubtedly benefited greatly, would also

have contributed to Marshall's impact on the writing of Nicholson's first economic monograph.

III

In 1888, Nicholson published *Money and Monetary Problems*, a book divided into two parts. *A Treatise of Money*, likewise subdivided into two parts from the third edition of 1895, made up the first component of the volume. Essays, largely devoted to monetary topics, but not exclusively so in every edition, made up the second part of the volume. The book appears to have been a popular one, going into many editions, of which the fifth edition, dated 1901, remains housed in the Marshall Library according to its 1927 Catalogue, presumably a gift from this 'former student' to his by then still revered teacher. Part I of the *Treatise of Money* discussed the general theory of money in eight chapters; Part II's seven chapters particularly examined 'the influence of the production of the precious metals on industry and trade.'

After an introductory chapter which warned of the difficulty of the topic, Part I of the *Treatise* in the third edition dealt in Chapter II with the functions of money ('medium of exchange', 'measure of value', 'means of deferred payments'); the requisites of good coinage (Chapter III); Gresham's Law (Chapter IV); the quantity of money and the level of general prices (Chapter V); the effects of credit on prices' (Chapter VI); influence of the price level in one country on that of other countries (Chapter VII) and effects on the price level from using both gold and silver as standard money, that is, bi-metallism (Chapter VIII).

Part II contained seven chapters in the third edition. Chapter I indicated the nature of current monetary problems in India, the United States and the United Kingdom. Chapter II described the differences between money and other commodities. Chapter III looked at the exchange values of gold and silver. Chapter IV reviewed the causes of changes in these values. Chapter V explained the quantity theory of money. Chapter VI discussed the interaction of gold and silver prices; while the final chapter (Chapter VII)

reviewed the effects of the annual production of gold and silver as additions to the monetary stock. Walter Bagehot's *Lombard Street* was perhaps the major monetary source cited in Nicholson's *Treatise*, while Adam Smith was the most frequently cited author. Marshall is quoted only once, from his submission to the Royal Commission on the Depression of Trade (Marshall 1886) in the context of his support for 'a tabular standard of value' (Nicholson 1895, p. 30).

Nicholson's essays included with the third edition of his *Treatise of Money* virtually all deal with either aspects of the quantity theory of money or the defence of bi-metallism, both directly and indirectly. Their dates of previous publication range from 1886 to 1893, with most of the papers dating from the final years of the 1880s. The first essay is a lengthy study of John Law, the Scottish banker and financier. When discussing the collapse of the Mississippi scheme, Nicholson applied the quantity theory as a way of explaining the interaction of money growth and rises in the price level. Nicholson (1888, 1895) however, strongly maintained that causality can run in various ways in the quantity theory as a relationship between money and prices. One example is the following. Price rises can frequently induce increases in money supply to enable the volume of exchange transactions to be maintained at the higher price level. In the context of Nicholson's paper on Law it is interesting to note that Antoin Murphy (1997, p. 6) described Nicholson's account of Law's scheme as 'more balanced' than that of Marx, and superior to that of Alfred Marshall. Nicholson's second essay presents the introduction of one pound (£1) notes as a good way of saving on gold use, since it would remove the gold sovereign from the wear and tear of active circulation. This essay is followed by a historical account of the long run impact of past gold and silver discoveries. Nicholson here sharply distinguished the increases in the world stock of silver from the bullion inflows associated with the discoveries and colonisation of the new world of the Americas, while the consequences of a large gold inflow are discussed in terms of the discoveries of the South African, Californian and Australian gold fields from the middle of the nineteenth century.

The remaining essays were substantially devoted to bi-metallism, and form the basis for Friedman's (1990) assessment of Nicholson's quality as a writer on that subject. The first essay, an address given in Manchester in March 1887, sought to demonstrate that bi-metallism was both advantageous and practicable as a major reform of the contemporary monetary system. The second paper addressed the 'morality of bi-metallism' to an audience drawn from the Economics Section of the Glasgow Philosophical Society. A third paper argued in support of the 'the stability of the fixed ratio between gold and silver under international bi-metallism', while the fourth paper reviewed the associated issue of measuring variations in the value of a monetary standard. The next paper in the volume explained the causes of general price movements, an excursion into the quantity theory in its broader sense. A critical overview of Giffen's attack on bi-metallism, together with comments on some other monetary reform proposals followed. Then came what Nicholson called 'a elaboration of the missing link' between gold and silver. The essays closed with a discussion of Indian currency experiments, a study of a silver standard country in essentially a gold standard world. Some of these essays, particularly Nicholson's critical explanation of the quantity theory as a theory of the price level, were indirectly critical of Marshall, who himself had criticised Nicholson's monetary views in a special memorandum he had submitted to the Gold and Silver Commission in June 1888. This episode (discussed in detail in Groenewegen 1996, pp. 65-77) can now be briefly mentioned.

The sequence of events is as follows. Marshall had drafted his comment criticising Nicholson's paper by 23 June 1888, discussing it with J.N. Keynes that weekend. Keynes later recorded in his diary that Marshall, sadly, had entered 'into controversy with Nicholson'; a further indication of Marshall's proclivities as a controversialist when he feared that his position on an economic subject had been misrepresented. These misrepresentations largely related to Nicholson's far too narrow perception of Marshall's view on the quantity theory. Marshall (1888, 1996, p. 74) addressed this aspect of the matter very clearly in his note on Nicholson, emphasising no less than seven variables as essential for the proper enunciation of the quantity theory. This position, Marshall argued, 'was in substantial agreement with the views of such writers as Professor Nasse'.

These seven factors were as follows: ‘the volume of the currency’, ‘population’, the amount of goods produced per head of population and their wealth generally’, ‘the amount of business to which any given amount of wealth gives rise’, ‘the proportion of these payments that are made for currency’, the average rapidity of circulation of the currency’, under which head provision could be made for the quantity of hoarding by individuals and by business, and ‘the state of commercial and political confidence, enterprise and credit’. These remarks conformed quite well with the view of the quantity theory Nicholson had put forward in his essay on that subject based on a talk to the Royal Society of Edinburgh, 30 January 1888, with the title, ‘Causes of Movements in General Prices’. Part of that essay (Nicholson 1888, 1895a, pp. 370-74) reads like a criticism of Marshall given his position as explained in the note on Nicholson. It is also very likely that given the date of Nicholson’s paper, 30 January 1888, its substance would have found its way into his submission to the Gold and Silver Commission. As I pointed out in 1996 (Groenewegen 1996, p. 67 n.8), a substantial segment of the contents of the second part of his *Treatise of Money*, although written in early 1895, could have appeared as part of his views on monetary theory in Nicholson’s submission, no longer extant, to the Gold and Silver Commission.

Marshall’s other criticisms of Nicholson’s submission covered the following matters. First was Marshall’s failure to see how he differed from Nicholson in accepting the ‘many causes which the older economists believed to be capable of exerting an influence on the gold price of silver’ (Marshall 1888, 1996, p. 70). Nor did Marshall accept Nicholson’s argument that a ‘fall in the gold price of silver’ will ensure ‘that all commodities exported to silver-using countries will at once fall in price’ (Marshall 1888, 1996, p. 71). Marshall associated such an analysis with an increased output of silver from greater production in silver-producing countries, raising the silver price of goods in India and the gold price of silver in England. These shifts would continue until a new equilibrium was reached in which the gold price of silver was once more in harmony with the gold prices to silver prices ratio (Marshall 1888, 1996, p. 72). Likewise, Marshall objected to Nicholson’s view that a depression of prices due to accidental causes would continue long after these causes had disappeared, an argument he claimed to have

convincingly refuted in his evidence to the Commission (Marshall 1888, 1996, p. 74). Other differences of opinion between the two related to the assumed speed of adjustments of wage levels, and those of internationally traded commodity prices (Marshall 1888, 1996, pp. 76-77). Given my earlier discussion (Groenewegen 1996), the matter need not be further pursued here.

IV

As already indicated, the three volumes of Nicholson's *Principles of Political Economy* appeared sequentially in 1893, 1897 and 1901. A second edition appeared over the years 1902 to 1909. The contents and structure of Nicholson's treatise followed that of John Stuart Mill's *Principles* in which Books on Production and Distribution preceded those on Exchange and on the impact of Progress on Distribution, and, the final Book, the Role of Government. In the same manner, Volume I of Nicholson's *Principles* looked at Production in Book I and Distribution in Book II; its Volume II presented Book III on Exchange; while Volume III examined the importance of Economic Progress in Book IV and the Economic Functions of Government in Book V. From the index, Adam Smith, closely followed by John Stuart Mill, are the major authorities used in writing the book. Marshall's *Principles* is fairly frequently mentioned in Volume I, often in a critical manner; less so in Volume II and Volume III. In the preface to the three volumes of Nicholson's *Principles*, Marshall shared acknowledgements with Sidgwick as Nicholson's valued teacher of political economy at Cambridge. Examining the impact of Marshall's work on Nicholson's *Principles*, both positive and negative, is the rationale for this section of the paper. Section IV does not, therefore, pretend to cover the contents of Nicholson's *magnum opus* systematically. One possible impact on Marshall of the completion of Nicholson's *Principles* in 1901 was suggested in the opening remarks to this paper: this hypothesised Marshall's very likely annoyance with the fact that Nicholson had managed to complete the three volumes of his *Principles*, while he himself was still unsuccessfully struggling with completing volume II.

Volume I of Nicholson's *Principles* cited Marshall on no less than twenty occasions, referring three times to the first edition (1879) of *Economics of Industry*; at least once to the first (1890) edition of Marshall's *Principles*, eleven times to the second (1891) edition of the *Principles*, and once to the *Elements of the Economics of Industry* (1892), of which Marshall had sent a complimentary copy to Nicholson when it was first published. The other five references to Marshall fail to mention a specific text.

Nicholson's longest references to Marshall occurred when Nicholson criticised him on points of his theory. This is the case of Nicholson's (1893, pp. 63-65) treatment of consumer's rent (later consumer's surplus) and of the nature and legitimacy of a concept of quasi rent (Nicholson 1893, pp. 411-414). There are also cases of implicit disagreement with Marshall in Nicholson's text. A good example is Nicholson's structure for much of the book in terms of the three agents of production (land or nature, capital and labour), hence omitting 'organisation', Marshall's fourth agent of production, the importance of which Marshall stressed especially in the *Principles* (Nicholson 1893, Book I chapter II, p. 33).

In what follows, the references to Marshall are taken *seriatum* as they occur in Nicholson's text. The first (Nicholson 1893, p. 50 n.3) indicates agreement with Marshall on the lack of need to classify 'goods according to the orders in which they rank with respect to consumption', in the way Menger had done. The next reference to Marshall is a three pages 'note' to Book I chapter III on consumption, in which Nicholson critically reviewed the notion of consumer's rent as an unwarranted concept if it was meant for practical application. Such application was indeed suggested by Marshall when he used it in his tax-bounty welfare argument. As previously indicated, Marshall suggested in correspondence with Seligman that Nicholson had misunderstood him on the subject in making this criticism. As already indicated, Nicholson (1894) repeated much of this criticism.

Subsequently, Nicholson (1893, Book IV chapter V, pp. 85-86) argued he could not agree with Marshall that 'the struggle for existence causes, in the long run, those races of

men to survive in which the individual is most willing to sacrifice himself for the benefit of his environment; and what are, consequently, the best adapted collectively to make use of his environment' (from Marshall 1891, p. 302). This point, according to Nicholson, was made more validly in the previous century by Sir James Steuart, though where Steuart made this comment Nicholson failed to indicate. In the chapter on capital, Nicholson lengthy discussion of Turgot's theory may have been implicitly inspired by Marshall's defence of that theory against Böhm-Bawerk's misleading criticism (Nicholson 1893, p. 88, cf Groenewegen 1995, pp. 473-5), but Marshall is not named in this context. Nicholson (1893, p. 94) cited *Economics of Industry* on the problem of classifying a doctor's carriage purely as capital, a statement Nicholson (1893, p. 94 n.1) suggested should be compared with Marshall's somewhat different account in his *Principles*. Nicholson's (1893, p. 95) next point referred to Marshall's *Principles* (1891) Book II Chapter IV, p. 125) and its treatment of human capital. At the end of the chapter on capital, Nicholson (1893, p. 103 n.2) approvingly mentioned Marshall's *Principles* (1891, Book VI, chapter II, note, pp. 572-6) for its criticism of Mill's four propositions on capital.

Nicholson (1893, p. 108) also approvingly mentioned Marshall's *Principles* (1891, p. 315) on the 'importance of interchangeability of parts of machinery' to facilitate and cheapen repairs to them. Six pages later (Nicholson 1893, p. 114n.1), Marshall's *Principles* (Book IV, chapter X, 'Concerning of Specialised Industries in Particular Localities', is praised as a very useful discussion of the importance of location for ensuring a satisfactory division of labour. Nicholson's (1893, Book I chapter VIII) treatment of production on a large scale and a small scale praised Marshall's 'excellent treatment of this topic' and used the definitions Marshall (1891, p. 325) had given of these two terms. In the context of the laws of diminishing returns and increasing returns, Nicholson (1893, Book I chapter X, p. 210) quoted Marshall's (1891, p. 210) remark on the importance of the 'marginal dose' applied to the fixed factor: 'all that is necessary is that it should be the last dose which can be profitably applied to the land.' This is also the last reference to Marshall in Book I of Nicholson's *Principles*.

At the start of Nicholson's (1893, p. 229) Book II, Marshall's *Principles* and those of Sidgwick are praised as 'the two most important works in Political Economy since Mill'. In this context, Nicholson noted that Sidgwick's Book II is called 'Distribution and Exchange' while Marshall called his Book VI, 'Value, or Distribution and Exchange', a difference on the significance of which Nicholson failed to elaborate. It is, however, not until Chapter X of Book II on wages, that Nicholson (1893, p. 325 n.1) mentioned Marshall's 1891 edition of the *Principles* on the subject of land rent. The rationale for this reference is not easy to grasp, since wages are not mentioned by Marshall in the material referred to, except briefly in the context of some remarks Marshall had made in this chapter on quasi-rent. Nicholson (1893, p. 331 and n.1) pointed to Marshall's remark in the *Principles* (1890, p. 14) that custom can sometimes act as a form of slow competition; while two pages later, Nicholson noted the discussion of 'normal' in relation to wages as discussed in the 1879 edition of the *Economics of Industry* (Book II chapters I and XIII) comparing it with the later remarks in Marshall's *Principles* (1891, p. 84) on 'normal' in relation to 'economic laws'. In connection with the impact of trade unions on wage levels, Nicholson (1893, pp. 383-4) cited Marshall's *The Elements of the Economics of Industry* (1892, Book VI, chapter XIII).

Nicholson's chapter on profits (Book II chapter VIII) contained several references to Marshall's work. Nicholson (1893, pp. 390-91) indicated that Marshall substituted the term 'waiting' for that of 'abstinence' (introduced by Nassau Senior) in the context of interest rate determination. Later on, Marshall and Walker were credited (Nicholson 1893, p. 399) with having developed Smith notion of the 'wages of superintendence' in their analyses of entrepreneurial incomes. In Book II, chapter XIV, devoted to economic rent, Nicholson queried the legitimacy of Marshall's use of the term, 'quasi rent', particularly since 'he has made a very extensive application of his theory.' However, Nicholson regarded use of the quasi rent concept as wrong, largely because it conflicted with Ricardo's notion that rent, as a return, related to productive powers which were 'indestructible'. Furthermore, the classical theory of rent, especially that of Ricardo, the leading authority on the subject in Nicholson's view, showed rent as arising from the 'niggardliness of nature' and not from its 'benevolence'. Such 'benevolence' arose from

the high productivity implied in the returns to investment in machines and human skills to which Marshall applied his notion of quasi rent. Nicholson (1893, pp. 413-14) conceded, however, that his quarrel over Marshall's use of quasi rent was simply 'a question of classification and analogy' but that even these types of issue could have significant consequences for the understanding of a problem.

Nicholson's second volume (1897) contained far fewer references to Marshall even though the third Book of which it was composed was completely devoted to 'Exchange'. For Nicholson, this topic included both money and international trade, topics not covered in Marshall's Book VI which combined Value, Distribution and Exchange in its title. Other topics which Nicholson covered in his Book III came in Marshall's Book on consumption and demand, production and supply, and the theory of equilibrium of demand and supply.

The less than half a dozen citations and other implicit references to Marshall's work fall virtually all within the first third of Nicholson's second volume, largely devoted to issues of domestic exchange and value. The first cited Marshall's 'nomenclature' of demand elasticity as a useful device, referring readers to Book III Chapter IV of the second edition of the *Principles* (Nicholson 1897, p. 29 n.1). Nine pages later, Nicholson (1897, p. 38) referred his readers to Marshall's analysis of 'temporary equilibrium of supply and demand' in Book V, chapter II of the second (1891) edition of the *Principles*. Nicholson (1897, Book III chapter V) on cost of production in relation to value made a reference to the 'normal' not coinciding with the 'average' rate, not attributed to Marshall, even though he made this point in this context. The third direct reference to Marshall, Nicholson (1897, p. 62 n.1) made when discussing monopoly and profit maximisation, in a general note which apart from Marshall, mentioned valuable contributions by Cournot and Edgeworth on the topic. A fourth reference to Marshall occurred in Nicholson's (1897, pp. 80-82) treatment of quasi-rent, essentially a short period concept since in the long run Marshall admits that 'the normal price of the product depends on the cost of the factors'. Nicholson concluded from his discussion that '*quasi-*

rent is an unforeseen and unstable exceptional profit or loss' (Nicholson 1897, p. 82), inconsistent with the meaning Marshall gave to this concept.

The many chapters on monetary topics (Chapter XI-XXII) contain no references to Marshall directly or indirectly, even in the context of Nicholson's (1897, p. 166 n. 1) reference to the Report of the Royal Commission on Indian currency, or to the other Royal Commissions on monetary and related issues to which Marshall had contributed evidence in the 1880s and early 1890s.

Two possible indirect references to Marshall occur in the context of Nicholson's lengthy chapters on the pure theory of foreign trade. The first relates to Marshall's choice of cloth and linen as examples of traded goods in the two commodities-international barter situation in his *Pure Theory of International Trade* (Marshall 1879). However, cloth and linen were likewise used in this way in J.S. Mill's international trade theory. The second is Nicholson's (1897, p. 323) critical remark on the use of 'consumers' rent' as a means of estimating the gain for consumers from international trade.

Volume III of Nicholson's *Principles of Political Economy* covered 'economic progress' in its Book IV and 'Functions of Government' in Book V. There are several direct references to Marshall in this volume, as well as some indirect ones. The first citation comes in a note in which Nicholson (1901, p. 116 n.2) favourably mentioned Marshall's 1879 *Economics of Industry* (p. 85 n.1) correction of 'a curious error in Mill', in which the algebra came from Nicholson, not Marshall. In the chapter 'On Progress and Profits' (Book IV, chapter VI), Nicholson (1901, pp. 121, 123) used the concept of consumers' rent 'to adopt the fashionable phrase', for explaining the gains of borrowers in paying the market rate of interest. Marshall, however, was not mentioned in these remarks by Nicholson. Later in the chapter, Nicholson (1901, pp. 141, 142 and n.2) mentioned quasi-rent as an 'exposition of the resemblance between the rent of land and other forms of income' on which Marshall's *Principles* (Book VI, chapter VIII) is cited as the major reference. Nicholson's by now frequently mentioned differences of opinion

with Marshall on quasi rent are described by him as only ‘a matter of language’. Finally, in the chapter on ‘wages and progress, Nicholson (1901, p. 151) cited census data reported by Marshall in his *Principles* (1898, fourth edition, p. 355 n.1).

There are only two direct references to Marshall in Nicholson’s Book V. First, Nicholson (1901, pp. 305-06) approvingly quoted Marshall’s *Principles* (1898, p. 524 n.2) on the view that the theory of the shifting of taxation is ‘an application of the theory of value in the broadest sense’. Ten pages later, Nicholson (1901, p. 315 n.1) referred his readers to Marshall’s *Principles* (1898, Book V, chapter XIII) as a presumably useful analysis of ‘taxes on monopolies’. Earlier, in Chapter III of Book V, Nicholson (1901, pp. 221, 235-6) referred approvingly to quasi rent in the context of a reference to *Industrial Democracy* by the Webbs; and in the second page reference, to the concept of ‘net value’ in a very Marshallian way. In both cases, Marshall is not explicitly mentioned by Nicholson.

Overall, Marshall’s *Principles* and his other writings (*Economics of Industry* 1879; *Elements of the Economics of Industry*, 1892) are used by Nicholson in his three volume text as one set of sources among many others. Marshall is never the major authority except, and then often critically, on particular points (consumers’ rent, quasi-rent). For Nicholson, Adam Smith and J.S. Mill remained the leading authorities on political economy, and only in the first volume, is Marshall, together with Sidgwick, described as a major authority from the ‘new generation’ of economists. For the second and third volumes, Marshall’s work was a much less frequently used reference, only valuable on a few specific points for his readers, so Nicholson thought. For example, Marshall is overshadowed for Nicholson on international trade and public finance by Bastable, Seligman, and Edgeworth; on progress Marshall is barely mentioned, and the few Marshall citations Nicholson made are on small technical points. Whether Nicholson thought Marshall too difficult for the readers of his text, which he had, after all, designed for pass student and not for the honours students targeted by Marshall’s *Principles* in Nicholson’s view, is one explanation. The restricted nature of many areas covered by Marshall in his published work, provides another. Marshall’s own assessment of

Nicholson's lack of theoretical ability may also be a factor here, since it may have made Nicholson increasingly suspicious of theory, as he got older. This type of argument is, however, best left to the concluding section, where it can be pursued on a broader front.

V

A student of Marshall, who appeared less and less enamoured with the work of the 'master' as he grew older, such was the Professor of Political Economy and Law at Edinburgh, J.S. Nicholson. On the surviving evidence, Nicholson at first seems to have been a loyal follower of Marshall's Political Economy, always in tandem, however, with that of Sidgwick, whose *Principles of Political Economy* had appeared a good seven years before Marshall's *Principles*. However, despite Nicholson's gratitude to his two Cambridge teachers of political economy and the admiration Nicholson had for their books, Nicholson always showed a far greater historical bent in his approach to the subject, a result of his earlier education outside Cambridge. He also continued to show a tremendous admiration for the great classical authorities who continued to guide him, John Stuart Mill and, especially, Adam Smith. Neither of them had had their day in Nicholson's view, and both, despite their errors, still had much wisdom to impart. This is fully evident from Nicholson's citation practice in the three volume *Principles of Political Economy*, and both Smith and Mill stayed the leading authorities for Nicholson over the whole of his professional life. His three volumes of *Principles*, it should not be forgotten, were completed over the 1890s, the same decade in which Marshall completed the first four editions of the first volume of his *Principles of Economics*.

Some aspects of Nicholson's treatment of Marshall as a source can here be reiterated. The first is the use Nicholson made of Marshall's books as a source of facts. This is the case for both the second edition of Nicholson's first book on *Machinery and Wages*, as well as his *Principle of Political Economy*. His reference to the *Elements of the Economics of Industry* on trade unions provides another good example of this. Secondly, there are the instances when Nicholson recognised Marshall as a great theoretician. This made his work valuable as an excellent reference for the more

advanced theory on topics such as the refutation of the wages fund doctrine, the theory of location of industry, the theory of temporary equilibrium of demand and supply, the notion of elasticity, the theory of monopoly and of profit maximisation, and the analysis of tax shifting. Thirdly, there are issues on which Nicholson believed Marshall to have been wrong. In monetary discussion, this included what Nicholson (wrongly) described as Marshall's narrow presentation of the quantity theory; in economic theory and its application it included both the notions of consumers' rent and of quasi rent, once again for basically wrong reasons on Nicholson's part. More broadly, there was Nicholson's criticism in his review of the first edition of the *Principles* of Marshall's approach to the structure of his *Principles*: poor history, poor structure, and too much repetition.

Part of this type of relationship between Nicholson and Marshall can be explained by the fact that Nicholson was one of the old Moral Sciences Tripos students, taught in economics by Sidgwick as well as Marshall, and a friend and close associate of other early Moral Sciences students, J.N. Keynes and Foxwell. Keynes checked the proofs of the three volumes of Nicholson's *Principles*, an arduous task; Foxwell was Nicholson's preferred successor to Marshall on his retirement, a preference which greatly annoyed Marshall. It was also a strong indication of Nicholson's taste in the practice of economics. No wonder Marshall and Nicholson drifted apart, becoming respective anathemas as writers to each other. In the end Marshall thought very little of Nicholson's *Principles* and other parts of his later work, describing them as 'intellectually slovenly' on virtually every page, and at best 'low calibre' economics. Nicholson was a student whom Marshall occasionally counted (as in the 1908 fragment mentioned in the opening paragraph of this paper) among his good products, but at other times as someone whose economic contributions he would prefer to forget. Nicholson likewise, over his life time, seems to have lost a great deal of respect for Marshall both as a person and, to a lesser extent, as an economist

References

- Cournot, A. (1877, 1982), *Revue sommaire des doctrines oeconomiques*, Paris: J. Vrin.
- Deane, Phyllis (2001), *The Life and Times of John Neville Keynes*, Cheltenham: Edward Elgar.
- Friedman, Milton (1990), 'Bimetallism Revisited', *Journal of Economic Perspectives* 4(4), Fall, pp. 85-104.
- Groenewegen, Peter (1995), *A Soaring Eagle: Alfred Marshall 1842-1924*, Cheltenham: Edward Elgar.
- Groenewegen, Peter, ed. (1996), *Official Papers of Alfred Marshall. A Supplement*, Cambridge: Cambridge University Press.
- Groenewegen, Peter, ed. (1998), *Alfred Marshall. Critical Responses*, London: Routledge, 2 volumes.
- Marshall, Alfred (1879), *The Pure Theory of International Trade*, London: The London School of Economics and Political Sciences, Reprints of Scarce Tracts No.1, 1930.
- Marshall, Alfred (1886, 1926), 'Royal Commission on the Depression of Trade. Answers to Questions', in J.M. Keynes, ed., *Official Papers of Alfred Marshall*, London: Macmillan, for Royal Economic Society.
- Marshall, Alfred (1888, 1996), 'Note on Professor Nicholson's Paper for the Gold and Silver Commission', in Groenewegen (1996), pp. 70-77.
- Marshall, Alfred (1890), *Principles of Economics*, London: Macmillan, first edition.
- Marshall, Alfred (1891), *Principles of Economics*, London: Macmillan, second edition.
- Marshall, Alfred (1892), *Elements of the Economics of Industry*, London: Macmillan.
- Marshall, Alfred (1898), *Principles of Economics*, London: Macmillan, fourth edition.

Marshall, Alfred and Marshall, Mary Paley (1879), *Economics of Industry*, London: Macmillan, first edition.

Marshall Library of Economics (1927), *Catalogue*, Cambridge: Printed for the Faculty of Economics at Cambridge University Press.

Murphy, Antoin (1997), *John Law. Economic Theorist and Policy Maker*, Oxford: Clarendon Press.

Nicholson, J.S. (1888, 1895), *Treatise of Money and Essays on Monetary Problems*, London: A. & C. Black.

Nicholson, J.S. (1888, 1895a), 'Causes of Movements in General Prices', in Nicholson, J.S. (1888, 1895), pp. 342-379.

Nicholson, J.S. (1891), 'The Living Capital of the United Kingdom', *Economic Journal* 1(1) March, pp. 95-107.

Nicholson, J.S. (1892), *The Effects of Machinery on Wages*, London: Swann Sonnenschein & Co., second edition.

Nicholson, J.S. (1893, 1962), 'The Reaction in Favour of the Classical Economy', in R.L. Smyth, ed., *Essays in Economic Method*, London: Duckworth, pp. 112-125.

Nicholson, J.S. (1893, 1897, 1901), *Principles of Political Economy*, London: A.& C. Black, volumes I, II, III.

Nicholson, J.S. (1894), 'The Measurement of Utility by Money', *Economic Journal* 4(2), June, pp. 342-347.

Nicholson, J.S. (1903), 'The Use and Abuse of Authority in Economics', *Economic Journal* 13(4), December, pp. 554-566.

- Rutherford, Donald (2004), 'Joseph Shield Nicholson (1850-1927)' in Donald Rutherford, ed., *The Biographical Dictionary of British Economics*, Bristol: Thoemmes Continuum, Volume 2, pp. 854-858.
- Schumpeter, J.A. (1954), *History of Economic Analysis*, London: Allen and Unwin.
- Scott, W.R. (1927), 'Obituary of J.S. Nicholson', *Economic Journal* 37(3) September, pp. 495-502.
- Whitaker, J.K., ed. (1996), *The Correspondence of Alfred Marshall. Economist*, Cambridge: Cambridge University Press for the Royal Economic Society, three volumes.