

The Evolution of Income Accounting in Eighteenth and Nineteenth Century Britain

Izumi WATANABE

Abstract

Double-entry bookkeeping appeared at the start of the thirteenth century in Italy, and developed into a system for calculating the total income of business by the first half of the fourteenth century at the latest. However, its primary role was not initially in total income calculation, but in the memorandum of debts and credits. The function of calculating total income of business at the end of the fiscal year didn't yet exist. After this, accounting underwent a major evolution accompanying the development of commerce and industry. In particular, significant changes occurred during the Industrial Revolution. In this paper, I will be looking at three questions: First, when did evaluation by market value occur? Secondly, why did people invent the comparative balance sheet, which was the genesis of the cash flow statement? Thirdly, how did depreciation come to appear instead of just the writing-down of the cost of fixed assets? I will mainly discuss these points to clarify the evolution of income accounting in eighteenth and nineteenth centuries Britain.

Keywords: Cash Flow Statement, Comparative Balance Sheet, Depreciation, Disclosure, Evaluation of Assets, Evolution of Income Accounting, Fair Value, Hamilton, Hayes, Historical Cost, Industrial Revolution, Mair, Malcolm, Market Value, Monteage, Ympyn,

1. Introduction

It is well-known that The Industrial Revolution in Great Britain has been clearly defined by Arnold J. TOYNBEE (1889-1975) and Paul MANTOUX (1877-1956). According to their explanations, it developed between the latter half of the eighteenth century and the early nineteenth century, especially in the 1760s to the 1820s. It refers to the conversion period that heralded the shift from the "Old industrial system", which was connected with agriculture, to a "Large-scale industrial system" which was connected with industrial capital.

Accompanying the birth of technology and new machinery, which was greatly developed during the Industrial Revolution, Great Britain built up a global market and achieved economic hegemony over the world. At the same time, many new industries occurred all over Great Britain. For example, huge iron, coal and railway industries were established during this period. This resulted in the establishment of modern capitalism.

The demand for iron (chiefly pig iron) and new sources of fuel prompted the birth of the big

coal, iron and railway companies. It depended upon not only the spread of the railway industry but was also effected by the Napoleonic Wars (1792-1812), and the Crimean War (1853-6). As a result of this, the production of iron with coal as fuel increased. Many iron companies were established in Staffordshire, Yorkshire, Shropshire, Glamorgan and Monmouth in South Wales between the latter half of the 18th century and the middle of the 19th century. Needless to say, if we examined it in detail, it was an age in which the overall development of industry in Great Britain had been widely achieved, although prosperity and recession came and went in cycles¹⁾.

Various new accounting techniques were designed with the coming of such an age, with new industries and new technologies. In this paper, I would like to analyse how the profit and loss calculation idea, which had its most important manifestation in accounting, evolved in Britain during the Industrial Revolution and accompanied the changes of the time.

2. Appearance of Current Value Valuation

2.1 Appearance of Revaluation for Merchandise Inventory

It goes without saying that the evaluation of assets at the settlement date has a large influence upon the measurement of business income. Generally speaking, the revaluation of inventories was not such a serious problem as that of revaluing fixed assets, because inventories were sold in the comparatively short term. Therefore, we can find few explanations of the revaluation of inventories until the eighteenth century in bookkeeping textbooks which were published in Great Britain at the time. On the other hand, the periodic revaluation of fixed assets had already appeared in the seventeenth century. However, it was not the problem of the allocation of depreciation cost, but the problem of the writing-down the cost of fixed assets.

The first book, in which the inventory goods that remained unsold was clearly recognised, was Ympyn's work of bookkeeping (1543). Jan Ympyn Christofells explained the procedures of closing by matching not the cost of purchases but the cost of goods sold with revenue²⁾. Generally speaking, measurement by historical cost continued until the eighteenth century.

John Mair (1702/3-1769), who was one of the most important British authors in his field published his book *Book-keeping Methodiz'd* in 1736, in which he described the traditional procedure of closing by Italian methods using historical costs as follows: "The Accompt must be credited by *Ballance* for the Goods remaining, valued at the prime Cost, which equals the inner Columns. After this it must be made Dr. to or Cr. By *Profit and Loss*, for the Gain or Loss made upon what are sold. Which evens the outer Columns, and closes the Accompt"³⁾.

2.2 Appearance of Current value Valuation for Merchandise Inventory

One of the very few bookkeeping works, in which the evaluation procedure by the current value was explained, was published by Richard Hayes in the first half of the eighteenth century in Great Britain. The title of this book was *Modern Book-keeping: or, The Italian Method improved* (1731). In chapter 8 "The Way to balance your Accounts, without shutting up your

1) LANGTON, John and MORRIS, R.J. [1986], *Atlas of Industrialising Britain 1780-1914*, London, pp.127-31.

2) YMPYN, Christofells Jan [1543], *Nouvelle Instruction*, Antwerpen, grant liure fol.10.

3) MAIR, John [1736], *Book-keeping Methodiz'd*, Edinburgh, p.77.

ledger”⁴), he wrote as follows: “If only Part of the Goods be sold, Dt. Balance Account on your Paper for the Value of those Goods that remain by you unsold, either at the Price they cost you, or at the Market Price. *N.B.* It is usual with Merchants, when they make a general Balance of their Books, to value the Goods that they have by them at the Market Price they then go at, at the Time of their balancing; but some do not so”⁵). Judging from his description, we can assume that some merchants evaluated goods remaining unsold not by historical cost but by current value (market value). But it is not certain whether valuation at market value was a popular method or not in those days, because there are still many bookkeeping textbooks after Hayes in which the closing procedure by historical cost was used. The difference between the current value and the historical cost, I think, is not the mere *appreciation* but the problems of the difference of income views; that is the current value evaluation means *profit in advance* or *expectation of profit*⁶).

Another famous author, Robert Hamilton (1743-1829), who had a great influence in late eighteenth century in Scotland wrote, “. . . affix a moderate value to each article, according to the current prices at the time; such a value as the owner would be willing at present to buy for”⁷). It is clear that he recommended the method of the measurement of goods remaining unsold by current value. However, the content was somewhat different though it was equally called current value: that is, Hayes’s current value meant *current exit value* and Hamilton’s current value was *replacement cost*. The differences are important. The *current exit value* as used by Richard Hayes means profit in advance; on the other hand the replacement cost as used by Robert Hamilton meant purchase in advance. Thus, the accounting methods concerning the market value of goods remaining unsold probably first appeared in the course of the eighteenth century.

2.3 Evaluation of Fixed Assets in the First Stage

The descriptions of the valuation of fixed assets can already be found in John Mellis’s *A Briefe Instruction and Manner how to keepe bookes of Accompts* (1588), and Stephen Monteaige’s *Debitor and Creditor Made Easie: or A Short Instruction for the attaining the Right Use of Accounts* (1675).

Though we cannot find a clear explanation on the dealings illustrated in his book, in which the current value method of evaluation was described, Mellis evaluated both fixed assets and current assets by historical costs. For example, *a Mansion House* in London which had been bought at 280 pounds was transferred to the balance account using the same price, which was the historical cost⁸). In the example of the *Wines Claret account*, the goods remaining unsold were transferred to a balance account at 189 pounds at the date of settlement. The sum was calculated by historical cost and also the delivery account was measured by the first in first out

4) HAYES, Richard [1731], *Modern Book-keeping: or, The Italian Method Improved*, London, pp.77-83.

5) *Ibid.*, p.79

6) WATANABE, Izumi [2000], “The Historical Change of Valuation Methods for Goods Remaining Unsold”, *Journal of Osaka University of Economics*, Vol.51 No.4, November.

7) HAMILTON, Robert [1788], *Introduction to Merchandise*, Edinburgh, 2nd, p.285.

8) MELLIS, John [1588], *A Briefe Instruction and Manner howv to keepe bookes of Accompts*, The Leager fol.4.

【Table 1】 *Grange=Farm*

1675				1676					
<i>Grange=Farm</i>				<i>Grange=Farm</i>					
		<i>l.</i>	<i>s.</i>	<i>d.</i>		<i>l.</i>	<i>s.</i>	<i>d.</i>	
Apr. 10	To Stock valued my Lease — —	1	300	—	Apr. 23	By Cash recd for butter and cheese	2	22	—
20	To Cash pd for 60 load of Manure	2	1	10	25	By 100 load Hay valued at 35 s. —	15	175	—
21	To Cash pd for Seed-Corn — — —	2	24	3	May. 3	By Calves No.16. valued at 17s.6d. pc — — — —	11	14	—
24	To Cash paid <i>Besse Hobbs her wages</i> —	2	2	10	1676	By ballance which I value my Lease — —	40	280	—
28	To Cash pd Taxes	2	1	10	Apr. 9				
May. 1	To John Broughton Esq; 6 Mo. Rent —		25	—					
1676	To loss and gain profited — — — —	16	136	7					
Apr. 9			491	—			491	—	—

(S. Monteage, *Debitor and Creditor Made Easie: or A Short Instruction for the attaining the Right Use of Accounts*, London, 1675, Ledger A, fol. 4.)

method (FIFO)⁹⁾.

Less than a century after Mellis, we can find a case where fixed assets were evaluated by current value, that is Stephen Monteage's *Debitor and Creditor Made Easie: or A Short Instruction for the attaining the Right Use of Accounts*, which was published in London in 1675. The first entry in the illustration of a *Grange =Farm account* started with 300 pounds in the debtor side, which was the opening entry. The sum was revaluated to 280 pounds and transferred to the balance account: that is the *Grange =Farm account* was evaluated at its closing date not by historical cost but by present value. Monteage said in a note, "In the Account of Stock this Lease was valued at 300 *l.* but now a year being elaps'd, it is fit it should be valued at less, which will make no difference in the Account of Ballances; but onely lessen the Gain"¹⁰⁾. The expenses of writing-down of fixed assets, (the difference between the historical cost and the current value) were transferred to the *profit and loss account* on the date of settlement.

2.4 Methods of Evaluating Fixed Assets in the 18th Century

Generally speaking, the concept of fixed assets had not yet been used in most of the accounting books published in Great Britain until the eighteenth century. However, we can find an explanation of the decreased evaluation for ships, buildings, equipment and so on in accounting books which were published in eighteenth century Britain.

Alexander Malcolm dealt with a fixed asset as a mixed account¹¹⁾ in his book, *A Treatise of*

9) *Ibid.*, The Ledger fol.10. The appearance of LIFO is after it enters the latter half of the 19th century or the 20th century.

10) MONTEAGE, Stephen [1675], *Debitor and Creditor Made Easie: or A Short Instruction for the attaining the Right Use of Accounts*, London, 'Here followeth the Balance of the whole Ledger', L2.

11) The accounts of fixed assets in the first stage were often used as mixed accounts as well as the merchandise accounts. That is, the repairs expenses were entered in the debit side and the house-rent received was entered in the credit side though they were the asset accounts.

【Table 2】 *Sloop Unity*

1793	<i>Sloop Unity</i>		<i>l.</i>	<i>s.</i>	<i>d.</i>	1793	<i>Contra</i>		<i>l.</i>	<i>s.</i>	<i>d.</i>
Jan. 1	To <i>Stock</i> , for my 2/1 freighted to Virginia,	1	470	—	—	Apr. 5	By <i>Cash</i> , for my 1/2 freight,	2	110	—	—
	To <i>Cash</i> , for repairs,	2	10	12	6	7	By <i>Sundries</i> , for 1/4 sold	—	260	—	—
Apr. 17	To <i>Profit and Loss</i> , gained,	6	124	7	6		By <i>Balance</i> , for prime cost of my 1/4,	35	235	—	—
			605	—	—				605	—	—

(J. MAIR, *Book-keeping Moderniz'd*, Edinburgh, 1773, pp.180-1)

Book-keeping, or, Merchants Accounts; in The Italian Method of Debtor and Creditor (1731). He said, “For *Account of Houses and Ships*: You may value them at the first Cost; and when that is stated on the Creditor-side, the Difference of the Debt and Credit is Gain or Loss, arising from the Difference of the Reparations, &c. and the Rents or Freights. Or you may take the Difference of the two Sides, and state as the Balance due to you; by which means the Value of the Thing will appear less and less at every balancing, till it’s nothing. And then in a new Inventory you enter it again, at what Value you think proper; and sometimes also you may appear to be a Loser, which must go to *Profit and Loss*; but the first Method I think the best: And though these Subjects do not really keep up their Value, yet I would continue them at the first Value till they were disposed of, or lost; or you may chuse to state them at another Value from Time to Time, as you think they are then really worth”¹²⁾. Judging from his description, it is clear that he recommended the valuation method by historical cost, but at the same time another method that is current value, was also included.

In the ship account in the first example of transactions of *Book-keeping Methodiz'd* by John Mair who was a distinguished bookkeeping author in eighteenth century Britain, the entries to transfer to a balance account at closing date were entered by the historical cost in the creditor and repair expenses and maintenance costs etc. were entered in the debtor. That is not only the prime cost to buy first; some expenses but also some revenues from lending it were entered in this account. Consequently a fixed asset was dealt with as a mixed account in his ledger.

The transfer cost to balance account at the closing date was done on the historical cost basis (see table 2), but in Mair’s accounting book, we cannot find an explanation for historical cost.

Another author, Robert Hamilton, one of the most important authors in eighteenth century Scotland, published *An Introduction to Merchandise* in Edinburgh (1777), in which some fixed assets were explained, like the *Share of Ship Hazard* account and *House in Lawn-market* account.

Hamilton said, “If the whole be still on hand, enter the present value on the Dr. of the balance sheet; and if this be different from the prime cost, charges included, enter the difference in the proper side of the profit and loss sheet”¹³⁾ (see Table 3).

12) MALCOLM, Alexander [1731], *A Treatise of Book-keeping, or, Merchants Accounts; in The Italian Method of Debtor and Creditor*, London, p.90. It was already introduced by MEPHAM, Michael [1988], *Accounting in Eighteenth Century Scotland* (New York & London, pp.218-9).

【Table 3】 Share of Ship Hazard

1774	Share of ship Hazard,		l.	s.	d.	1774	Contra		l.	s.	d.
Mar. 25	To William Ainslie,					Apr. 25	By Cash, for share prof.				
Apr. 30	bought 1/2 share for	7	150	—	—		of a voyage to Rot.		33	—	—
	To Profit and Loss	1	23	—	—	30	By Balance-accompt	7	140	—	—
			173	—	—				173	—	—

(HAMILTON, R., *An Introduction to Merchandise*, Edinburgh, 1788, 2nd ed., pp.314-5)

3. Appearance of Cash Flow Accounting

3.1 Income Measurement from the Aspect of *Stock* to the Aspect of *Flow*

The early thirteenth century, double-entry bookkeeping was generated as the debit and credit memorandum and came to have the present function of calculating the total income by the middle of the fourteenth century. At the birth of the fourteenth century, total income was calculated not by *profit and loss account* but by *Bilancio* (an inventory combined with an appropriation statement), which was made from the actual inventory. That is to say, in those pioneering days of double-entry bookkeeping, the accounting practice of calculating the total income of a partnership by a profit and loss account based on continuous records of transactions had not yet been formed. Therefore, the profit and loss in partnerships was calculated for over 100 years by *Bilancio* which was based on the actual inventory as a result of not calculating total income by continuous records of transactions.

Even within one partnership, there were two types of partnerships in Italy at that time. Venetian partnerships were mainly formed among blood relatives, and were called a *family partnership*. Therefore, the necessity to calculate strictly the income for sharing among families was not so important in the family partnership in Venice until Income Tax Law was enforced. Because the merchants of those days in a family partnership only had to close each account of merchandises or voyages, and had to calculate profit when all of the merchandise was sold out or each voyage was over.

On the other hand, partnerships in Florence, called a *terminal partnership*, were formed among people who were not always blood relatives. They were usually formed among groups of people undertaking contracts of three to five years. Therefore, it was necessary for them to divide the period and to distribute the income, though it was not always done as regularly as in the present day. Such a system for calculating total incomes of partnerships appeared at the same time. Subsequently, from the first half of the sixteenth century to the seventeenth century, a system for calculating the total income every year would be integrated.

The idea of calculating income from the value of *stock* continued until the latter half of the eighteenth century. In those days, income calculation by making a *Bilancio* was probably more popular among merchants than the idea from the concept of causes by *matching revenue and cost*. This was because the merchants could depend not upon the income of a *profit and loss account* which was a profit on paper but upon the profit of *Bilancio* which was a realised profit.

13) HAMILTON, Robert [1788], *An Introduction to Merchandise*, Edinburgh, 2nd ed., p. 285.

The following two factors led to the conversion of the idea of calculating the income from the aspect of *stock* to the aspect of *flow*. One was the expansion of consignment by agencies in American trades from the end of eighteenth century to the middle of the nineteenth century. As the main business of an agent was the consignment sale of merchandise, it was not necessary for agencies to purchase merchandise themselves, or to possess buildings and land. In other words, agencies had no need to amass large assets and they had no need to calculate income from the aspects of *stock*.

Another reason is the necessity of fund-raising when a big company was first established, for instance canal companies, coal & iron companies, railway companies and so on. The amount of investment drawn from stockholders came to be extremely important to managers. The judgment, not from the view of *stock* but from that of *flow*, became a more important inducement to invest, that is, how much profit the enterprise could get in a year was very important to the stockholders, much more so than how much of the property they owned. It came to be the most important factor in an investment decision. In other words, this situation, I think, changed the focus of an investment from *stock* to *flow*. At the same time, this made managers recognise the importance of disclosure by making the financial statements discussed below.

3.2 Genesis of Cash Flow Statement

For big business as represented by iron, coal and railway companies etc, enormous capital was required for new investments. An interesting attempt at achieving capital investment for an enterprise expansion strategy was done by an iron and coal company: the Dowlais Iron Company. This became the starting point of today's cash flow statements.

The Dowlais Iron Company was established on 19th September 1759 by Thomas Lewes in Glamorgan in South Wales, as a partnership of eight partners with a total investment of £ 4,000. The production of iron in Dowlais made it the biggest company in the world for productive capacity, and it became one of the founding forces of the Industrial Revolution. From 1847 to the 1850s the Dowlais Iron Company fell into a business slump because of a long series of strikes and capital overinvestment¹⁴.

In March of 1860, the Dowlais Iron Company received an income of 30,882, but in March 1861 income decreased to £ 8,832, and in 1862 it decreased to only £ 3,059. However in 1863 the profit had recovered to £ 36,572. In this context, we should consider an interesting letter, in which a factory manager wrote to one of the owners on the 18th of July, 1863 (see table 4).

Basically, he had no cash to invest for a new blast furnace to produce any more pig iron. The manager of the manufacturing segment was worried about why there were no funds to invest in a new blast furnace, despite there being profit shown in the financial statements. In order to resolve this question, he made a new statement that was called a *comparison balance sheet*, in which he tried to pursue the questions; "Where does the profit go?" and "What is profit?"

Entering the nineteenth century, the Dowlais Iron Company expanded rapidly in scale and

14) JONES, Edgar [1987], *History of GFK (Vol. 1: Innovation and Enterprise, 1759-1918)*, Houndmills, p.3, Glamorgan County Record Office eds. [1960], *Iron in The Making Guide to Exhibition Held at County Hall*, Glamorgan County Records, p.2, and EDWARDS, J.R. & BABER, C., [1979, Spring] "Dowlais Iron Company: Accounting Policies and Procedures for Profit Measurement and Reporting Purposes", *Accounting and Business Research*, Vol.9 No.34, p.139.

【Table 4】 The Letter to Mr.G.T.Clark

Dowlais Iron Works on Works													
18th July 1863													
Dear Sir													
I have the honour to send you herewith the Balance Sheet of these Works for the year ending 31 March 1863.													
For the last seven years the Cost of Iron at Dowlais has been reduced gradually year after year, and for 1863 it is again reduced, and taking into account that all ordinary expenditure upon improvements, and upon the proper maintenance of each department has been charged, this cost is I believe lower than any shewn at Dowlais.													
You have been able to profit by the business of 1863 on Coal and Iron to the amount of £36,572. 9. 3 after paying off above £30,000 for Vochrhim Pits, Penyardren, Dantrittant, Vale of Neath Extention &c. In arriving at the above profit I have assumed that the concession in the Bute Royalties will be made for 1863. If this is not allowed, the profits will be reduced by about £4,000.....													
As the Books shew this favourable result this year it may naturally be asked where are the profits, is the surplus in Cash or how does it appear? This is explained as follows													
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;">Increase in Assets in 1862 (£78,519.19. 6 of this Cardiff Yard)</td> <td style="width: 20%;"></td> <td style="width: 30%; text-align: right; padding: 5px;">£81,814. 6. 1</td> </tr> <tr> <td style="padding: 5px;">Less in assets in 1863 as compare with 1862 (£78,519.19. 6 of this Cardiff Yard)</td> <td></td> <td></td> </tr> <tr> <td style="padding: 5px;">Less Liabilities increased</td> <td style="text-align: right; padding: 5px;">38,354. 4. 7 6,887.12. 3</td> <td style="text-align: right; padding: 5px;">45,241.16.10</td> </tr> <tr> <td style="padding: 5px;">Profit in 1863</td> <td></td> <td style="text-align: right; padding: 5px;">£36,572. 9. 3</td> </tr> </table>	Increase in Assets in 1862 (£78,519.19. 6 of this Cardiff Yard)		£81,814. 6. 1	Less in assets in 1863 as compare with 1862 (£78,519.19. 6 of this Cardiff Yard)			Less Liabilities increased	38,354. 4. 7 6,887.12. 3	45,241.16.10	Profit in 1863		£36,572. 9. 3	
Increase in Assets in 1862 (£78,519.19. 6 of this Cardiff Yard)		£81,814. 6. 1											
Less in assets in 1863 as compare with 1862 (£78,519.19. 6 of this Cardiff Yard)													
Less Liabilities increased	38,354. 4. 7 6,887.12. 3	45,241.16.10											
Profit in 1863		£36,572. 9. 3											
The great increase in the assets is in the greatly increased Stocks at Cardiff Yard of Finished Iron. The Stocks of Finished Iron in course of delivery and at Works, the Stocks of raw material, unfinished iron, stores, &c. account to £255,134. 4. 3. This is very much higher than it has been of late years. This together with the amounts owing to us at March 1863 amounted to £287,479.14.10. Deduct from thus the debits due by the Co. for Ore, Railway tonnages, &c. £39,987.10. 6. leaves the sum of £247,492. 4. 4. as a Floating Capital for the trading of the Firm.													
In a report made by me Nov. 1860 I expressed my concurrence with Mr. Rate's estimate of the capital required for the proper carrying on of the Dowlais business.													
He then spoke of £250,000, and, as compared with the large Reserve funds in the period of the partnership I thought this sum a modest one, and that £130,000 is reasonable.													
It is thought now that we have been holding too large an amount of Stock at the Works. Latterly this has been considerably reduced, but the reduction is completely outweighed by the Cardiff Stock of Bars Rails &c., which stands at £130,905 0.8., and is £78,519.19. 6. more than previous year.													
Still, as this is about three months make of iron, it may be fair to look upon this as a three months credit or outstanding account.....													

【Table 5】 Assets—Comparative Statement of November 1852 & March 1863

	Nov. 1852			March 1863			Increase			Decrease		
1 . Exor Sir J.J.Guest	39,697	3	1	72,469	6	5	33,772	3	4			
1a . Trustee				1,173	2		1,173	2				
2 . Lands Mines etc.	275,388	7	3	278,870	7	3	3,482					
3 . Cash	197	8	4	1,307	11	2	1,110	2	10			
4 . Stocks	107,092	17	10	255,134	4	3	148,041	0	5			
5 . Upper Branch Railway	6,798	2	11							6,798	2	11
6 . Lower Branch Railway	33,308	13	5	33,640	19	1	332	5	8			
7 . Sales a/c London House	63,596	18	9	13,296	19	9				50,299	19	
8 . Debts due to the D. & Co.	11,013	13		6,156	5					4,857	8	
9 . E.L.Hutchins				10			10					
10 . Coal debts due to the Company.				7,538	17		7,538	17				
	537,093	4	7	669,597	11	1	194,459	17	3	61,955	9	11
				537,093		1	61,955	9	11			
			£	4	7							
				132,504	7	4	132,504	7	4			

Liabilities— Comparative Statement of November 1852 & March 1863

	Nov. 1852			March 1863			Increase			Decrease		
1 . Debtor General	990	18	5							990	18	5
2 . "Stock"	503,200			503,200								
3 . Income and P.Tax	132	3	8							132	3	8
4 . E.L.Huchins	69	5	9							69	5	9
5 . Debts owing by D. & Co	32,770	16	9	39,747	8	4	7,046	11	7			
Lady C. Guest				3	3	9	3	3	9			
Coal Debts owing by Co.				240	2	2	240	2	2			
	537,093	4	7	543,190	14		7,289	17	6	1,192	7	10
				537,093	4		1,192	7	10			
				£ 6,097	9	8	6,097	9	8			
							Increase in Assets			132,504	7	4
							Less Increase in Liabilities			6,097	9	8
										126,406	17	8

(Glamorgan Record Office, Cardiff in UK, D/DG, E8.)

increased its income with its expansion. Dowlais tried to use the profit acquired from this success in business as a fund for investment in the construction of new blast furnaces. However, when actually investing, the factory manager recognised that there was a cash deficit although profits of considerable amount had been acquired. Such simple questions as "Where has the profit disappeared to? or What does profit mean?" occurred. As a result of this, The manager of the manufacturing segment tried to understand the real meaning of profit and to do this, he implemented a comparison balance sheet.

A comparison between the balance sheets of the Dowlais Iron Company could be made with in “the summary of changes in the position of company” of the Great Eastern Railway, as explained in Green’s *Corporation Finance*¹⁵⁾ or “Summary of Transactions as shown from the Balance Sheets on Page 86” in Cole’s *Accounts Their Construction and Interpretation*¹⁶⁾ and these financial statements would soon develop into the cash flow statement of today.

4. Origin of Depreciation

4.1 From Evaluation Decrease to Depreciation

The evaluation of assets by their market value already had a big influence in the calculation of corporate income by the latter half of the seventeenth century. However, it was not until the end of the eighteenth century that depreciation really appears. Especially, after the nineteenth century, in the iron and coal companies or railway companies there was a necessity for not just the writing-down of the cost but for depreciation to be recognised and discussed as a method of cost allocation, because these big companies required many fixed assets such as a factory, a mechanical, a steam engine and so on.

The fundamental procedure of double-entry bookkeeping today is not so different in comparison with the medieval double-entry bookkeeping system. But, when we examine it in detail, we can find many differences in concrete procedures. In particular, it is very important for us to recognise the differences as follows; first, the need for an income calculation system to calculate business income every year had not yet arisen, secondly, that financial statements had not appeared and, thirdly, that the idea of depreciation had not yet occur.

The valuation of goods remaining unsold, generally speaking, was less problematic in comparison with fixed assets, because inventories can soon be sold. On the other hand, fixed assets are easily affected by price change if they are held for a long term. The necessity of current value evaluation of fixed assets was becoming an important problem for strict income calculation. When a ratio of fixed assets in relation to total assets became large, the necessity and importance of depreciation began to be recognised. Afterwards, depreciation methods expanded immediately from the nineteenth century onwards. A.C.Littleton said as follows; “Before the present century, however, questions of valuation were less prominent, although present. Fixed assets were few and depreciation discussions were infrequent, but the problem was not ignored.”¹⁷⁾ However Littleton’s point, I think, is not quite correct, because as I have already described the evaluation of assets had already appeared in the sixteenth century and the concept of depreciation occurred at the end of the eighteenth century or at the very start of the nineteenth century.

The valuation of fixed assets was measured by historical cost until the concept of depreciation appeared. Needless to say, depreciation is not the writing-down of the cost but the allocation of the cost of the assets. In the early days, it was generally agreed that a fixed asset was treated as a *mixed account* as well as a merchandise account (see table 2). It was the period

15) GREEN, Thomas L. [1897], *Corporation Finance*, New York, p.110.

16) COOL, William Morse [1908], *Accounts Their Construction and Interpretation*, Boston, New York and Chicago, p.101.

17) LITTLETON, A.C. [1933], *Accounting Evolution to 1900*, New York, p.151.

before the nineteenth century when a method of evaluation by market value for fixed assets appeared.

It was after the Industrial Revolution that the importance of fixed assets was recognised and enormous amounts of capital were invested for the enhancement of plant and equipment. Between the latter half of the eighteenth century and the first half of the nineteenth century, huge fixed assets were required in railway companies, iron companies and coal companies, it was then a new accounting method for the treatment of fixed assets appeared; depreciation as the method of allocation of historical cost became commonplace. "Eighteenth century writers did not use the term 'fixed asset' but their approach to the valuation of such assets as Houses and Ships can be examined"¹⁸⁾.

When the prices of fixed assets were relatively inexpensive, there were no problems manipulating the cost as a lump-sum when they were bought. The idea of cost allocation of fixed assets was not necessary until their ratio to all assets came to be higher. B.S.Yamey, quoting Eric Roll's work, *An Early Experiment in the Industry Organization, being a History of the Firm of Boulton and Watt, 1775-1805* (London, 1930), stated that "The notion of the systematic percentage writing-down of the cost of fixed assets is not encountered in any of seventeenth- and eighteenth-century English records or treatises I have examined. The late eighteenth-century accounts of the firm of Boulton and Watt do, however, include annual debits for the depreciation of buildings, at 5 per cent. per annum. Widespread use of modern methods of recording depreciation as an amortisation of a lump-sum outlay seems to have developed only in the second half of the nineteenth century"¹⁹⁾. However, such cases where depreciation generally was acknowledged were still rare in eighteenth century Britain. It was in the railway companies from the mid nineteenth century that we find depreciation in accounting practices.

4.2 Depreciation in Railway Companies

While the ratio of fixed assets to total assets was not so relatively high, the idea of depreciation was not necessary. If the writing-down cost of fixed assets was recognised, a bookkeeper could reduce this cost as a collective expense. It was after the proportion of fixed assets to total assets came to be higher that depreciation as the method of cost allocation evolved.

When we discuss the origin of depreciation, we should examine accounting methods of railway companies. It is well-known that, although steam locomotion had already been invented by Richard Trevithick (1771-1833) in 1804, it was in 1825 that steam locomotion actually became a business and thereafter was commonly used. Later, Stevensons' "Rocket" achieved 44 kilometers per hour and won 1st prize at a speed competition, in 1829 at Rainhill in Liverpool. The first public railway in the world opened for business between Liverpool and Manchester in September 1830, and was also the start of the age of the so-called *Railway Mania*.

Depreciation in railway companies started from the necessity of deciding fares. At the same time, managers worried about how to acquire investment from many shareholders who wished to invest but who had not yet recovered from the after effects of the *South Sea Bubble* (1720) including the subsequent related legislation. As the result of this, new accounting methods in

18) MEPHAM, Michael [1988], *Accounting in Eighteenth Century Scotland*, New York & London, p.218.

19) YAMEY, Basil S. [1962], "Some Topics in the History of Financial Accounting in England 1500-1900", in Baxter and Davidson eds., *Studies in Accounting Theory*, Illinois, p.34.

the early railway business were invented, for example for maintenance and the renewal of steam locomotives and iron rail vehicles. These new trials created depreciation. It is said that depreciation appeared as a financial policy of capital procurement when industrial capital was established (in the 1920s in Britain, and in the 1930s in the United States).

5. Conclusion

Many big companies such as canals, railways, iron, coal and so on, were established one after another during the Industrial Revolution. Accompanying the appearance of these big companies, the importance of securing a capital supply became greater. Each company had to make widely known how safe and how advantageous the investment was in order to get funds from as many shareholders as possible. Enormous amounts of capital were needed in railway companies and iron and coal companies that started from the end of the eighteenth century to the beginning of the nineteenth century, especially from the 1820s onwards. At the same time, other requests brought about improvement to accounting practices; the appearance of balance sheets and profit and loss statements is one example. It came to be an immediate factor causing the appearance of financial statements and professional public accountants.

Generally speaking, in the case of railway companies, enormous amounts of capital were demanded for construction, and it took many long years till the opening of the operation. The Stockton and Darlington Railway took four years till the construction, and eight years till it began operation. The shareholders of Stockton and Darlington Railway Company could not get dividends from their investments. Therefore a device to get dividends from the investments was required even in such conditions. One of the devices was *interest during construction*, while another was the issue of *preference shares* over ten years²⁰⁾.

The movement to this disclosure is known from examples of balance sheets for the British East India Company and the Bank of England²¹⁾. Reflecting such movements, the practice of disclosing the financial conditions via balance books, in which balance accounts of several years were collected for present and future shareholders, was gradually established in iron, railway companies and so on. This happened by the end of the eighteenth century.

It is after the nineteenth century that financial statements were made to disclose financial conditions and operating results to shareholders. Specifically, in the iron and railway companies, such financial statements were made for the acquisition of capital. In practice, *profit and loss accounts* (sheets) preceded *balance sheets*, but in company acts, balance sheets preceded profit and loss account (sheets). It is well known that the 1844 Company Act obliged companies to use a balance sheet, although a format of a balance sheet was not provided until the Company Act of 1956. In article 123 in the 1929 Act, "The directors of every company shall at some date not later than eighteenth months after the incorporation of the company and subsequently once at least in every calendar year lay before the company in general meeting a profit and loss account or, in the case of a company not trading for profit, an income and expenditure account for the period, in the case of the first account, since the incorporation of the company,

20) EVANS, George Herberton [1936], *British Corporation Finance 1775-1850 A Study of Preference Shares*, Baltimore, pp.74-5.

21) TAKATERA, Sadao [1971], *Accounting Policies and Evolution of Bookkeeping*, Kyoto, pp.430-39.

and, in any other case, since the preceding account, made up to a date not earlier than the date of the meeting by more than nine months, or, in the case of a company on business abroad, by more than twelve months”²²⁾. It is here that the system of disclosure was established.

The Industrial Revolution produced many new accounting problems, and promoted new accounting practices. We just saw the appearance of the comparative balance sheet, which is the origin of the cash flow statement, the spread of evaluation of fixed assets or goods remaining unsold by present value, the birth of depreciation and so on. The era between the second half of the eighteenth century and the middle of nineteenth century in Britain has come to be seen as a vitally important epoch in the evolution of accounting.

REFERENCES

- COLE, William Morse [1908], *Accounts Their Construction and Interpretation*, Boston, New York and Chicago.
- EDWARDS, J.R. ed. [1981], *British Company Legislation and Company Accounts, 1844-1976*, Vol.1, New York.
- EDWARDS, J.R. & BABER, C., [1979, Spring] “Dowlais Iron Company: Accounting Policies and Procedures for Profit Measurement and Reporting Purposes”, *Accounting and Business Research*, Vol.9 No.34.
- EVANS, George Herberton [1936], *British Corporation Finance 1775-1850 A Study of Preference Shares*, Baltimore.
- GLAMORGAN COUNTY OFFICE eds. [1960], *Iron in The Making Guide to Exhibition Held at County Hall*, Glamorgan County Records.
- GREEN, Thomas L. [1897], *Corporation Finance*, New York.
- HAMILTON, Robert [1788, 2nd ed.], *An Introduction to Merchandise*, Edinburgh.
- HAYES, Richard [1731], *Modern Book-keeping: or, The Italian Method Improved*, London, pp.77-83.
- JONES, Edgar [1987], *History of GFK (Vol. 1: Innovation and Enterprise, 1759-1918)*, Houndmills.
- LANGTON, John and MORRIS, R.J. [1986], *Atlas of Industrialising Britain 1780-1914*, London.
- LITTLETON, A.C. [1933], *Accounting Evolution to 1900*, New York.
- MAIR, John [1736], *Book-keeping Methodiz'd*, Edinburgh.
- MALCOLM, Alexander [1731], *A Treatise of Book-keeping, or, Merchants Accounts; in The Italian Method of Debtor and Creditor*, London, p.90. It was already introduced by MEPHAM, Michael [1988], *Accounting in Eighteenth Century Scotland* (New York & London, pp.218-9).
- MELLIS, John [1588], *A Briefe Instruction and Manner howv to keepe bookes of Accompts*, London.
- MEPHAM, Michael [1988], *Accounting in Eighteenth Century Scotland*, New York & London.
- MONTEAGE, Stephen [1675], *Debtor and Creditor Made Easie: or A Short Instruction for the attaining the Right Use of Accounts*, London.
- TAKATERA, Sadao [1971], *Accounting Policies and Evolution of Bookkeeping*, Kyoto, pp.430-39.
- WATANABE, Izumi [2000], “The Historical Change of Valuation Methods for Goods Remaining Unsold”, *Journal of Osaka University of Economics*, Vol.51 No.4, November.
- WATANABE, Izumi [2005], *The Evolution of Income Accounting*, Tokyo.
- YAMEY, Basil S. [1962], “Some Topics in the History of Financial Accounting in England 1500-1900”, in Baxter and Davidson eds., *Studies in Accounting Theory*, Illinois.

22) EDWARDS, J.R. ed. [1981], *British Company Legislation and Company Accounts 1844-1976*, Vol.1, New York, p.50.

YMPYN, Christofells Jan [1543], *Nouuelle Instruction*, Antwerpen, grant liure fol.10.

(本研究は、2006年度特別研究費の補助による研究成果の一部である。)