

## Accounting Historians Journal

---

Volume 8  
Issue 2 Fall 1981

Article 3

---

1981

# Discounted cash flow and business valuation in a nineteenth century merger: A note

John Richard Edwards

Alison Warman

Follow this and additional works at: [https://egrove.olemiss.edu/aah\\_journal](https://egrove.olemiss.edu/aah_journal)

Part of the [Accounting Commons](#), and the [Taxation Commons](#)

---

### Recommended Citation

Edwards, John Richard and Warman, Alison (1981) "Discounted cash flow and business valuation in a nineteenth century merger: A note," *Accounting Historians Journal*: Vol. 8 : Iss. 2 , Article 3.

Available at: [https://egrove.olemiss.edu/aah\\_journal/vol8/iss2/3](https://egrove.olemiss.edu/aah_journal/vol8/iss2/3)

This Article is brought to you for free and open access by the Archival Digital Accounting Collection at eGrove. It has been accepted for inclusion in Accounting Historians Journal by an authorized editor of eGrove. For more information, please contact [egrove@olemiss.edu](mailto:egrove@olemiss.edu).

*The Accounting Historians Journal*  
Vol. 8, No. 2  
Fall 1981

*J. R. Edwards*  
and  
*Alison Warman*  
UNIVERSITY COLLEGE, CARDIFF

## **DISCOUNTED CASH FLOW AND BUSINESS VALUATION IN A NINETEENTH CENTURY MERGER: A NOTE**

*Abstract:* In 1889 the Shelton Iron, Steel and Coal Company Limited was incorporated to take over the assets and business activities of two existing companies. To guide the contracting parties in negotiating a price to be paid for the properties belonging to the Shelton Collieries and Ironworks an independent valuation was arranged by Deloitte, Dever, Griffiths & Co., later appointed auditors of the new company. The article comprises an appraisal of the valuation exercise, which is an early example of the use of a discounted cash flow technique to provide relevant information for a capital investment decision.

Discounted cash flow (DCF) criteria have been applied to insurance matters and financial investments for several centuries, but it is only during the present century that they have gained widespread theoretical acceptance for capital investment purposes. Capital value theory was developed by economists such as Irving Fisher and Alfred Marshall in the 1920s, leading to formal expositions of the net present value (NPV) rule and the internal rate of return (IRR) model by P. A. Samuelson and K. Boulding respectively in the 1930s.<sup>1</sup> However, employment of these techniques as part of the decision-making process within United Kingdom companies is not as widespread as might be expected and is sometimes supposed to be the case. G. D. Newbould's study of takeover and merger activity in the late 1960s<sup>2</sup> showed that none of the companies included in his survey had made use of DCF techniques to value an enterprise, either as a means of assessing the viability of a prospective investment or as a means of retaliating against a low bid. The most popular methods of valuation, identified by Newbould, were book or market values of assets and current market prices of securities. Comparison of price earnings ratios was also favoured as a means of assessing a prospective investment. Judged theoretically, each of these methods is considered to be sub-optimal.

Book and market values of assets bear no necessary relationship to future earnings capacity, the market price of a security reflects only the value of a minority interest, whilst the price earnings ratio is based on past earnings.

Why have these inherent errors of principle not deterred companies from using sub-optimal valuation methods in preference to the theoretically pre-eminent DCF techniques? The reasons have not changed since they were first identified by Bonbright in the 1930s.<sup>3</sup> Forecasting future cash flows and selecting a suitable discount rate are subjective exercises difficult to defend in law. Forecasting future cash flows inevitably involves a strong element of crystal-ball gazing and, instead of a series of known returns, estimates used will be, at best, a range of possible outcomes dependent upon the occurrence or nonoccurrence of various future events. Moreover the discount rate which, in theory, should represent the risk-free rate of interest plus a premium for risk, both unknowns, must, in practice, also be estimated. The effect of these practical difficulties is that DCF techniques have come to be regarded, by many businessmen, as academic ideals with little relevance to the imperfect market in which firms operate. It is therefore interesting to discover that as early as 1889, well before the techniques had achieved even widespread academic recognition, use was being made of DCF valuation procedures in an uncontested merger.

#### *An Early Application of the DCF method*

Two enterprises, Lord Granville's Shelton Collieries and Ironworks (SCI) and the Shelton Iron and Steel Company Limited (SIS), agreed to join together to form the Shelton Iron, Steel and Coal Company Limited (SISC).<sup>4</sup> To guide the contracting parties in negotiating the price to be paid for SCI, Messrs. Deloitte, Dever, Griffiths & Co., later appointed auditors of SISC, arranged for William Craig of Cheshire<sup>5</sup> to value the property belonging to the former company. The detailed terms of reference given to Craig are repeated in his report dated 16 July 1889 and include the requirements to advise on "the condition of the . . . [properties] . . . and on their present value."<sup>6</sup>

*Model Employed.* The basic model used by Craig for the purpose of computing the DCF value is, in essence, identical with the theoretical model recommended today. Craig forecasts future cash flows based on recent past results and his assessment of the various factors which might be expected to alter these results in the future and, second, estimates a suitable discount rate which, when applied

to the cash flows, produces a figure for present value.<sup>a</sup> A preliminary criticism which might be directed at Craig's report is that it does not incorporate a calculation of the break up value of the business, i.e., the lowest price that the vendor should be willing to accept for the sale of the enterprise as a going concern. Nor does he estimate the maximum price the rational purchaser will pay, namely the replacement cost of an enterprise possessing a similar earning capacity. However, these matters were not explicitly included in the terms of reference given to Craig. The owners of the merging concerns were, of course, maintaining their proprietorial links as shareholders of the new concern.<sup>7</sup> This suggests that a policy decision had been made to continue investing in the manufacture of iron and steel and, except in the unusual circumstance of the break up value exceeding replacement cost, the calculation of these upper and lower limits would have served no useful purpose.

The practical difficulties encountered by Craig when attempting to apply the theoretical model to a real business situation were no different from those facing investment appraisers today. It is therefore interesting to consider how he tackled the problem, the extent to which his figures were relied upon for price-fixing purposes, and the degree of success achieved by a comparison with subsequent events. These matters are examined below.

### *Methodology*

The early part of the report lists and describes the various leases, pits and blast furnaces which comprised the undertaking.<sup>8</sup> The effect of using this approach is to divide the entire enterprise into a number of separate and distinct parts as the basis for the valuation exercise, the results of which are summarised in Table I.

*Cash Flows: Collieries.* For each of the pits the present rate of working and the reserves yet unworked are identified.<sup>9</sup> In accordance with his terms of reference, Craig next assesses the financial implications of opening up several new workings on the leasehold properties.<sup>10</sup> Inclusion of the expected financial effects of development proposals for the collieries is explained in two ways. First, the enterprise was obliged under the terms of its two leases to sink an extra three pits within certain time limits and, second, since

<sup>a</sup>Craig's exercise would seem to compare favourably with another early (1915) attempt at investment appraisal for which some sophistication is claimed by George A. Wing, in his article "Capital Budgeting, Circa. 1915," but which uses only simple interest tables to compute present values.

**Table 1**  
**Present value of SCI per Craig's Report dated 16 July 1889**

	Years	Cash Flow £	Discount Rate %	Value at End of Year 7 £	Discount Rate %	Present Value £	£
<b>COLLIERIES</b>							
Duchy Lease, 30 years:							
Present Workings	1-30	14,646p.a.	15				96,165
Additional Revenue from Opening New Pits, Com- mencing Year 8							
	8-30	14,854p.a.	15	95,051	7	59,056	
Cost of Development							
	1-7	3,751p.a.	5			(20,661)	38,395
End Value of Plant	30	50,000	5				11,550
Sneyd Lease, 40 years:							
Revenue from De- veloping Lease, Commencing Year 8							
	8-40	30,000p.a.	15	198,000	7	123,294	
Cost of Development							
	1-5	9,000p.a.	5			(38,961)	84,333
End Value of Plant	40	15,000	5				2,130
							<u>232,573</u>
<b>BLAST</b>							
FURNACES	Perpetuity	5,000	10				50,000
<b>COPY HOLD</b>							
LAND	30	12,000	5				2,772
							<u>£285,345</u>

Source: Craig, pp. 28, 29 and 35.

several of the pits currently in use were almost worked out new mines needed to be opened up in order to maintain present levels of production. The potential of the new pits was estimated from geological surveys and detailed information regarding conditions of working the same seams of coal and ore by neighbouring concerns. In Craig's judgment<sup>11</sup> the new pits could be expected to yield a more valuable class of coal under easier mining conditions and, therefore, prove more profitable than existing workings.<sup>12</sup> In estimating cash flows from present workings and new developments,

Craig uses average prices ruling during the twelve months immediately prior to the date of the valuation exercise, but he does consider the implications of the following expected future developments in the price of coal and wages rates paid to colliers.

1. The price of coal had been comparatively low for twelve years but during the last six months there had been some improvement and Craig was of the opinion that the higher current prices would be maintained in the future.<sup>13</sup> A repetition of the overproduction of coal which occurred in the 1870s was considered improbable as, from that bitter experience, mine owners had learned that such a situation was disastrous for the supplier.<sup>14</sup>
2. Owing to the passage of the Mines Regulations Act of 1887, which restricted the employment of inexperienced and therefore lower paid colliers, an increase in business operating costs was forecast.<sup>15</sup> However, Craig argued that any resulting rise in wage rates would be substantially offset by the lower cost of working the new pits.

Overall, the only significant departure, from the pattern of costs and revenues used for valuation purposes, which Craig considered likely to occur, was the possibility that future coal prices would be higher than the previous year's average prices; i.e. a conservative valuation was implied.

*Cash Flows: Blast Furnaces.* It is when we turn to the valuation of the blast furnaces that it becomes more difficult to reconcile Craig's calculations with available factual evidence.<sup>16</sup> During the period 1885-89 an aggregate loss of £28,786 arose from operating the blast furnaces, but during the six years prior to 1885 trading results had been more favourable and he uses the overall returns for the period 1879-89 to produce an average annual profit of £2,858. Still not satisfied, Craig points out that iron prices had been low for a number of years but were, in his opinion, now showing signs of improvement. This, he feels, justifies using an average annual revenue of £5,000 for capitalisation purposes. One reason for averaging returns over a number of years, as a basis for future projections, might be to avoid distortions which would be caused by the existence of cyclical fluctuations in trading activity. No suggestion was made in the report that this was the intention. Indeed it is perhaps more instructive, to note the inconsistency between the blast furnace valuation, based on average results over a ten-year period, and the valuation of coal, based on profits earned

during the previous twelve months thus ignoring the less favourable results arising previously from coal.

*Discount Rates.* It is probably in the choice of discount rates that Craig's analysis is weakest in theory compared with present day DCF criteria. It is generally accepted that the rate used should be a function of the perceived risk attaching to the cash flows from the investment, and that the assessment of that risk and the calculation of the risk premium must be a subjective exercise based primarily on the valuer's judgment. The discount rate in DCF calculations represents an estimate of the opportunity cost of employing funds in an investment of a particular risk class. It would therefore seem appropriate, when valuing a business concern, to consider one rate as applicable to the enterprise as a whole, given its overall risk class. Table 1 shows that Craig selects different rates not only for separate departments but also (1) for cash outlays and inflows relating to a single project, and (2) for different time periods within the same stream of cash inflows. This means that Craig has a range of discount rates, each adjusted according to the risk and uncertainty which he perceives for each stream of cash flows and for each time period. In all he makes use of four different rates, 5% for cash outlays, 15% for revenue from the collieries, further discounted at 7% where there is a seven year delay before revenue begins to emerge, and 10% for revenue from the blast furnaces. Each of these rates includes a premium over what may be considered the risk-free rate of interest in July 1889. For instance, the bank rate at that date was 2½%,<sup>17</sup> although it did fluctuate between 2½% and 6% during the latter part of the nineteenth century. It is likely that, in fixing the risk premiums, Craig had in mind the returns achieved by similar concerns in the locality with which he was closely acquainted.

Once again it is the blast furnaces which receive the most favourable treatment. Despite his already optimistic assessment regarding the revenues likely to arise from that source, Craig introduces further upward bias by applying a discount rate of 10%, compared with 15% for coal reserves.

### *Values Employed*

In the event, Craig's valuations were not used as the direct basis for fixing the price paid to Earl Granville, the sole proprietor of SCI. The prospectus published to advertise an issue of preference shares and debentures by the acquiring company (SISC), at the time of its incorporation, includes reference to Craig's valuation of

Granville's "properties at £285,345 exclusive of stocks of coal and ironstone and stores,"<sup>18</sup> but this is cited presumably only as evidence of the conservative nature of the figures actually used. Separate agreements attached to SISC's memorandum of association, dated December 1889, show that the sale of SCI was "carried out upon the basis of the balance sheet of the said business at the 30th day of June 1889"<sup>19</sup> and that the sale of SIS was "carried out upon the basis of the balance sheet of the said business at the 3rd day of August 1889."<sup>20</sup> Balance sheets of the vendor companies appear not to have survived, but the figures at which the assets were initially accounted for by SISC are clearly set out in the unpublished balance sheet of that concern dated 31 December 1889, and this document includes £257,119 for the properties belonging to SCI.<sup>21</sup>

Although one may have major reservations concerning the economic significance of the asset values which were used for the purpose of fixing prices payable to the vendors, it must be remembered that the method of business combination being discussed is in the nature of a "pooling of interests" rather than an acquisition. It is true that external sources of finance amounting to £250,000 (£100,000 debentures and £150,000 preference shares) were raised at the time SISC was formed, of which £220,000<sup>22</sup> was paid out to Granville and the shareholders of SIS whose proprietary interests were correspondingly reduced.<sup>23</sup> Nevertheless, the entire equity interest in SISC continued in the hands of individuals who had been proprietors of the merged concerns. This, together with the fact that there was no major disparity between the size and scale of operations of the merged concerns, would cause the event to be accounted for in some countries today, though not in Great Britain,<sup>24</sup> on the "pooling" basis. It is also true that, at SISC, one accounting characteristic of pooling was absent, namely the carrying forward of the retained earnings of the amalgamating companies as the retained earnings of the resulting entity; however, the other characteristic was clearly present, *viz.* the carrying forward of the book values of assets belonging to the amalgamating companies to the new concern. Consequently it would seem that we have an early, albeit partial, example of pooling based on the idea that the accounting value of assets is not affected by the legal formality of transferring them to a "new" owner where there is no real change in the proprietary interest. This is not to suggest that those responsible for merging the activities of SCI and SIS were consciously pioneering any radical development in accounting theory and practice. Indeed, the main virtue of the treatment adopted may have



been its easy application and firms elsewhere may well have been doing much the same.<sup>25</sup>

The effect of using the figures in SCI's balance sheet, at 30 June 1889, was to value the company at the historical costs incurred in acquiring and developing properties prior to that date. The question arises: why did the contracting parties choose not to use Craig's valuation for price-fixing purposes? In the absence of available evidence, we can only speculate on their possible motives. Craig's calculations were based on two series of cash flows, namely amounts expected to accrue from property presently being worked and amounts expected to accrue from the development of leases to be taken over by SISC. Although it is perfectly legitimate to incorporate both series in the valuation exercise, particularly as the leaseholder was obliged to undertake development expenditure under the terms of the leases, it does not follow that the purchaser will be willing to pay the figure which results. In view of the considerable uncertainty attaching to cash flows based on development expenditure yet to be undertaken, the purchaser might well argue for a lower figure, possibly based on present production potential. Table I shows a total value of £232,573 for the collieries, and this includes £96,165 attributable to present workings. One attractive feature of the collieries' figure of £189,611,<sup>26</sup> appearing in the balance sheet of SCI, could have been that it fell at a convenient point between those two valuations.

The figure of £50,000 described as "plant, machinery, furniture, goodwill etc." in the agreement between SCI and SISC, is interesting. This item covers the six blast furnaces owned by Granville's concern, a fact which might help to explain Craig's determination to place a similar valuation on the furnaces despite a five-year history of continuous loss making. An alternative explanation for the coincidence of figures is that, as the agreement between SCI and SISC was signed towards the end of 1889, the £50,000 valuation was written into the balance sheet of the former concern *after* Craig had made his report, dated 16 July 1889.

The book values on which the prices paid to the vendors were based, and which appear in the 31 December 1889 balance sheet of SISC, were soon abandoned. It is not surprising that management should have wished to make some adjustment to the heterogeneous selection of figures transferred from SCI and SIS. For instance, there is evidence which shows that many of the figures attached to assets taken over from SIS represented expenditure incurred, at various stages during the previous twenty-five years,

to which no adjustment had been made subsequent to the date of acquisition.<sup>27</sup> A revaluation of the assets taken over was reported to the company's auditors in a letter dated 19th January 1891.<sup>28</sup> This exercise resulted in a significant reallocation of book values between asset accounts and produced a shortfall of £30,000 which was debited to goodwill.<sup>29</sup>

### *An Ex Post View of Craig's Valuation*

The difficult problems inherent in achieving a precise assessment of present value, namely accurately forecasting future cash flows and identifying the right discount rate, are well understood. This being so, it might seem churlish to concern ourselves overmuch with an examination of the actual results achieved by SISC in the years immediately following incorporation, particularly in view of the early stage at which these fairly sophisticated calculations were being attempted. Nevertheless, post fact evaluation of earlier business decisions is an important, if sometimes neglected, aspect of management's learning process, and this is sufficient justification for considering forecasts in the light of actual results.

There are practical difficulties which prevent us from carrying out a detailed comparison, at the company level, of forecast results with actual results achieved. First, SISC was formed to carry on the combined activities of two existing companies and, although the management accounting system of SISC calculated the profit or loss for each department,<sup>30</sup> a further analysis of results between the assets of each of SISC's forerunners was probably considered irrelevant and was not made. A second difficulty arises because "the system of arriving at interdepartmental costs was altered from January 1st, 1891, the basis of charging at market price being changed for that of charging at cost price."<sup>31</sup> This change in the company's system of pricing transfers between departments was made at the instigation of the company's auditors, Deloitte, Dever, Griffiths & Co.,<sup>32</sup> who had expressed concern with a method of account keeping which made it impossible to establish the actual cost of stock when preparing the annual balance sheet.<sup>b</sup>

<sup>b</sup>Strict application of the realisation concept might be desirable for the purpose of external reporting but its use within the management information system may be more difficult to justify. The result of the change made at SISC was that transfers of materials between the collieries, blast furnaces, and iron and steel making departments were made at cost, instead of market price which had been used previously. The effect was that, henceforth, internal accounting reports contained less useful measures of the absolute and relative profitability of each department, e.g. assuming the market price of surplus coal sold to outsiders exceeded cost, the re-

Despite these obstacles certain *ex post* observations can be made relevant to Craig's valuation. For the sixteen years following incorporation, SISC did little better than breakeven, and it was only the favourable conditions for iron and steelmaking created by the First World War which saw SISC enjoy a period of sustained prosperity.<sup>33</sup> During the two-and-a-half years following incorporation the reported results were poor and prospects were sufficiently unfavourable to cause one of the company's shareholders to criticise the amount paid to the vendors.<sup>34</sup> Moreover, the company's chairman, when addressing the sixth annual general meeting, admitted that the period since incorporation had been one of depression following earlier prosperity,<sup>35</sup> and the point has been made elsewhere<sup>36</sup> that the reported results of SISC, prior to 1910, would have been even worse but for the failure to make regular charges to reflect the depreciation of fixed assets.

In order to obtain a clearer idea of whether the poor results achieved following incorporation should have been foreseen, we must re-examine Craig's valuations in the light of subsequent events.

*Collieries.* In 1891 Emmerson Bainbridge of Sheffield was asked by the Board<sup>37</sup> to inspect the mining properties and advise on their "present condition and prospects."<sup>38</sup> His report, dated 2 November 1891, begins by drawing attention to the fact that "the company was formed just at a time when the temporary inflation of the Coal and Iron trade was at the best."<sup>39</sup> An important assumption on which Craig's projections were based was proven wrong by subsequent events. He expected the recent recovery in coal prices to continue, whereas for six years during the 1890s the average price of coal was significantly below that ruling in 1889.<sup>40</sup> It is likely that this forecasting error was partly offset by two factors—(1) wage rates, which were tied to the price of coal by the sliding scale,<sup>41</sup> also fell<sup>42</sup> and (2) over the full forecasting period coal prices were higher than had previously been the case.<sup>43</sup> Regarding the price paid for the collieries, Bainbridge makes the following critical observations:

I may add at this point (although it may not be within the province of my Report) that considering the outlay upon new works which has for sometime been understood to be necessary, and the stipulation of the leases, and the need for opening out new Coalfields, the value placed upon

sults of the collieries were understated and those of the iron and steel making departments overstated, judged by comparison with today's generally accepted accounting procedures for measuring profit.

these Collieries at the time the Company acquired them was in my opinion very much beyond their actual worth.<sup>44</sup>

We have seen that the figure for the collieries, appearing in the balance sheet used as the basis for fixing the price paid to the vendor, was £189,611.<sup>45</sup> This is well below Craig's valuation of £232,573, which incorporates the expected financial effects of future developments under the lease. Indeed, the value Craig placed on present workings, £95,165, was probably much nearer what Bainbridge would have considered an appropriate price.

*Blast Furnaces.* Doubt has already been cast on whether the £50,000 valuation placed on the blast furnaces was the result of an entirely objective estimation process. For the four years prior to the date of Craig's report, losses had been running at an average annual level of £7,196. Craig's optimistic assumption that prices would rise sufficiently to convert this loss into an annual profit of £5,000 proved unjustified as it was a further ten years before iron prices began to improve.<sup>46</sup> This is not something which is clear only with the benefit of hindsight. Following Bessemer's discoveries in the 1860s there had been a rapid substitution in demand of steel for iron and, as early as 1863, the ironmaster William Crawshay had remarked that "the star of the iron trade was setting fast."<sup>47</sup> In mitigation of Craig's assessment, it must be said that Jeremiah Head, who was asked to investigate and report on the various departments in 1892, gave no indication either that the iron making potential was in poor condition<sup>48</sup> or that it was overvalued.<sup>49</sup> Also, the managers at SISC must have considered it *undervalued* at £50,000 for, when the purchase consideration was reallocated, a figure of £60,250 was included for the blast furnaces.<sup>50</sup>

### *Summary and Conclusion*

The inconsistency of using a single year's results as a basis for projections in the case of the collieries, while for the blast furnaces a ten-year average was calculated, has been pointed out. The use of a number of different interest rates depending on the nature and duration of estimated cash flows has also been criticised. Apart from these two weaknesses, we consider the mechanics of Craig's valuation exercise to be satisfactory. The underlying assumptions on which the calculations were based, however, turned out to be wrong. The rise in the price of coal in the first half of 1889 was a temporary phenomenon and not part of the continuous trend which Craig assumed. In addition, iron prices remained de-

pressed throughout the 1890s, instead of rising sufficiently to convert losses into profits as Craig had hoped. Some doubt has also been cast on the relevance, for price-fixing purposes, of a valuation based on income projections, a major portion of which may arise only if additional capital is raised and future investment decisions are undertaken. As it turned out, the only use made of Craig's estimate of present value was to demonstrate, to new investors brought in at the time SISC was incorporated, the conservative nature of the basis actually used.

One possible explanation for the contracting parties' ultimate decision to use balance sheet values for price-fixing purposes is that, unlike Craig's figures, they take no explicit account of the potential value accruing to new work. However, balance sheet values based on the accounting concept of historical cost are today regarded as an unsound basis for resource allocation decisions. This may not have been the case in 1889, though it is more likely that the combined balance sheet values of SIS and SCI happened to approximate "real" values, and it was considered convenient to use them pending a revaluation of the entire concern. An alternative explanation, put forward for the decision to employ balance sheet values, is that the strong element of continuity of ownership justified the use of a modified version of the pooling of interests basis of accounting for mergers.

#### FOOTNOTES

<sup>1</sup>Parker discusses the contribution of political economists to the development of capital theory, pp. 64-68.

<sup>2</sup>Newbould.

<sup>3</sup>Bonbright, Ch. 12.

<sup>4</sup>Edwards, J. R. discusses the reporting practises employed by the directors of SISC, in the years following incorporation, and their implications for the sources employed to finance business activity.

<sup>5</sup>The name and address of solicitors Norton, Rose, Norton & Co., 57½ Old Broad Street, EC1, appear on the front cover of Craig's report. Craig was not himself a solicitor and enquiries have failed to reveal whether he possessed any professional qualifications.

<sup>6</sup>Craig, p. 1.

<sup>7</sup>There were also issues of preference shares and debentures to the general public.

<sup>8</sup>Craig, pp. 3-5.

<sup>9</sup>Craig, pp. 5-18.

<sup>10</sup>Craig, pp. 19-29.

<sup>11</sup>Craig's suitability for undertaking the valuation exercise rests on his own declared experience of coal mining in neighbouring districts, Craig, pp. 21 and 27.

<sup>12</sup>Craig, pp. 19 and 29.

<sup>13</sup>Craig, pp. 17 and 26.

<sup>14</sup>Craig, p. 17.

<sup>15</sup>Craig, p. 17.

<sup>16</sup>Craig, pp. 32-35.

<sup>17</sup>Mitchell, p. 458.

<sup>18</sup>NWRRRC/472/book 23/fo. 1, *Prospectus* dated 12th December, 1889.

<sup>19</sup>NWRRRC/472/book 24, *First Schedule* attached to SISC's memorandum of association dated 6th December, 1889, p. 49.

<sup>20</sup>NWRRRC/472/book 24, *Second Schedule* attached to SISC's memorandum of association dated 6th December, 1889, p. 62.

<sup>21</sup>NWRRRC/472/book 53/fo. 22, balance sheet attached to letter from Deloitte, Dever, Griffiths & Co., dated 23rd June, 1890.

<sup>22</sup>£120,000 was payable in cash with the proceeds arising from the £100,000 5% first charge debentures, later offered to the general public, also due to Granville, NWRRRC/472/book 24, *First Schedule* and *Second Schedule* attached to SISC's memorandum of association dated 6th December, 1889, pp. 51 and 64, respectively.

<sup>23</sup>Except that some of the new issues may well have been taken up by the former owners of SIS and SCI.

<sup>24</sup>A proposal, not acted upon, that certain business combinations should be accounted for on the "Pooling Basis" was included in *Exposure Draft 3*, issued by the Accounting Standards Committee in 1971.

<sup>25</sup>Since those early days the treatment has attracted an increasing amount of attention and no little support in certain quarters, Rayburn pp. 290-310, although it was not until more than half a century later that the American accounting profession first gave explicit consideration to accounting for mergers on the pooling basis. A report, from the committee on public utility accounting of the American Institute of Accountants, dated 1 May 1945, suggested that one hypothesis which required careful consideration was "that no new cost can result from a transaction that . . . may be regarded as effecting a 'pooling of interest,'" p. 152.

<sup>26</sup>NWRRRC/472/book 53/fo. 22.

<sup>27</sup>Edwards, J. R., pp. 243-244.

<sup>28</sup>NWRRRC/472/3/1, SISC minute book 1889-92, fo. 152.

<sup>29</sup>NWRRRC/472/book 32/fo. 69.

<sup>30</sup>NWRRRC/472/book 53/fo. 26, letter from Deloitte, Dever, Griffiths & Co. dated 23rd June, 1890.

<sup>31</sup>NWRRRC/472/book 53/fo. 56, report signed by Lynam dated 26th February, 1892.

<sup>32</sup>NWRRRC/472/book 53/fo. 22, letter from Deloitte, Dever, Griffiths & Co. dated 23rd June, 1890.

<sup>33</sup>Edwards, J. R., p. 256.

<sup>34</sup>*Staffordshire Sentinel*, 13th April, 1892, comment by Mr. Lyon, shareholder, at the second ordinary meeting of SISC.

<sup>35</sup>*Staffordshire Sentinel*, 17th April, 1896.

<sup>36</sup>Edwards, J. R., p. 256.

<sup>37</sup>NWRRRC/472/3/1, SISC minute book 1889-92, fo. 202.

<sup>38</sup>Bainbridge, p. 1.

<sup>39</sup>Bainbridge, p. 2.

<sup>40</sup>Mitchell, p. 476.

<sup>41</sup>Edwards, Ness, Chs. 5 and 6.

<sup>42</sup>Mitchell, pp. 350-351.

<sup>43</sup>Mitchell, pp. 476-477.

<sup>44</sup>Bainbridge, p. 11.

<sup>45</sup>NWRRRC/472/book 53/fo. 22.

<sup>46</sup>Mitchell, p. 493.

<sup>47</sup>Birch, p. 10.

<sup>48</sup>Head's main criticism concerned the system of "dual management and divided responsibility," Part III, p. 21.

<sup>49</sup>The takeover figures were used by Head to calculate "the proper sum to be set aside for depreciation," Part III, p. 19.

<sup>50</sup>NWRRRC/472/book 32/fo. 69.

#### BIBLIOGRAPHY

- Accounting Standards Committee. *Exposure Draft 3, "Accounting for Acquisitions and Mergers,"* 1971.
- American Institute of Accountants. *Yearbook 1944-45.* New York: American Institute of Accountants, 1946.
- Bainbridge, Emmerson. *Report on the Shelton Iron, Steel and Coal Works.* 2nd November, 1891, NWRRRC/472/2/10.
- Birch, Alan. *The Economic History of the British Iron and Steel Industry 1784-1879.* London: Frank Cass, 1967.
- Bonbright, J. C. *Valuation of Property.* Vol. 1. Charlottesville, Virginia: The Michie Company, 1937.
- Craig, William. *Report on the Shelton Collieries and Ironworks.* 16th July, 1889, NWRRRC/472/book 53/fo. 1.
- Edwards, J. R. "British Capital Accounting Practices and Business Finance 1852-1919, An Exemplification." *Accounting and Business Research*, Vol. 10 (1980), pp. 241-258.
- Edwards, Ness. *The History of the South Wales Miners.* London: The Labour Publishing Company, 1926.
- Head, Jeremiah. *Report on the Iron and Steel Works of the Shelton Iron, Steel and Coal Company Limited.* 2nd March, 1892, NWRRRC/472/2/11.
- Mitchell, B. R. (with collaboration of P. Dean). *17: Abstract of British Historical Statistics.* Cambridge University Press, 1971.
- Newbould, G. D. *Management and Merger Activity.* Liverpool: Guthstead, 1970.
- North Western Regional Record Centre (NWRRRC) of the British Steel Corporation, Shotton Works, Deeside, Clwyd, Wales, contains the financial books and records of the Shelton iron and steel companies, designated reference number 472.
- Parker, R. H. "Discounted Cash Flow in Historical Perspective." *Journal of Accounting Research*, Vol. 6 (1968), pp. 58-71.
- Rayburn, Frank R. "The Evolution of Pooling of Interests Accounting: 1945-1970," in Coffman, Edward N., ed. *The Academy of Accounting Historians Working Paper Series.* Vol. 1, Working Papers 1-20. The Academy of Accounting Historians, 1979, pp. 288-317.
- Staffordshire Sentinel*, 1892, Staffordshire Record Office, County Buildings, Eastgate Street, Stafford, England.
- Wing, George A. "Capital Budgeting, Circa. 1915." *Journal of Finance*, Vol. 20 (1965), pp. 472-479.