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AGENT'S REPUTATION, ACCOUNTING AND COSTING IN ORGANISATIONAL CONTROL STRUCTURES

Abstract: This paper examines the roles of accounting and costing in the management of coal mining during the Industrial Revolution in Britain, and considers the impact of the agent's reputation in the development and use of these systems.

INTRODUCTION

This paper deals with the accounting and costing systems employed during the British Industrial Revolution at Tanfield Moor Colliery in North East England. The paper has three objectives: (1), to add to the body of research [Edwards, 1989; Fleischman and Parker, 1991] that questions the view of Pollard [1965, p.248] that "the practice of using accounts as direct aids to management was not one of the achievements of the British Industrial Revolution"; (2), to challenge the expectation of Fleischman and Parker [p.363] that "nascent cost accounting would flourish more notably in a factory environment" than in extractive industries; and (3), to examine the use of accounting and costing information by an absentee owner and his agent, and in doing so, to provide some reflections on principal-agent relationships and organisational control. The paper is organised into three main sections. In the first section, the context is set by means of a review of the relevant literature of the coal industry. In the second section, aspects of agency theory are outlined and a detailed examination is undertaken of the accounting and costing systems employed in the particular context of Tanfield Moor Colliery. Finally, the implications of the current research are considered.

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THE CONTEXT

The "Bibliography of the British Coal Industry" [Benson, 1981] indicates a vast literature on the British Coal Industry. However, in setting the context for the current paper, the present author has noted the caveat expressed in the definitive series "The History of the British Coal Industry": coal was a regional industry rather than a national one. Although this caveat was expressed [Hatcher, 1993, p.vi] in relation to the period up to 1700, "intense regional diversity" [Church, 1986, p.2] continued to characterise the industry throughout the eighteenth and nineteenth centuries. Thus the contextual analysis of the current paper is based on North East England in particular, and factors relating to other regional or to national circumstances are drawn into the analysis only if they are directly relevant.

The North East of England is made up of two counties, Northumberland and Durham, and has three major rivers that lead to the sea: the rivers Tyne, Wear and Tees. Access to the sea was crucial to the development of the North East as Britain's premier coal mining region. Coal is an extremely bulky and heavy commodity in relation to its market value, making its overland transport difficult and costly. Water transport was the only cost-effective means of transporting coal over long distances: in 1675 Sir Robert Southwell considered that transporting coal from Newcastle Upon Tyne to London by an overland route was sixty times more expensive than by the sea route [Hatcher, 1993, p.13]. The North East was unique in having ample coal deposits, access to the sea and being within striking distance of the key market of London. Thus the North East was well placed to respond when the demand for coal grew in the London market under the pressures of rising population, increasing industrialisation and the depletion of timber-fuel reserves. Although precise output figures are a matter of great debate there is a consensus [e.g. Blake, 1967; Hatcher, 1993; Nef, 1932], that the late sixteenth century marked the first great expansion of the region's coal industry. Output rose from 90,000 tons in 1560, c. 40 per cent of national output, to 1,250,000 tons in 1700, c.47 per cent of national output [Hatcher, 1993, p.68], to about 3 million tons in 1775, c.34 per cent of national output, and to about 7 million tons in 1830, c.23 per cent of national output. This reduction in national dominance took place as industrial demand for coal grew

throughout the country and facilitated supply by other coal fields.

Between 1805-1830, the North-East coal trade was dominated by the Joint Durham and Northumberland Coal Owners Association [Flinn, 1984, p.256]. The major function of the joint association was to enhance colliery profits by restricting output and eliminating price competition. The total "vend" or sale of coal was fixed by a central committee that allocated quotas to collieries on a fortnightly or monthly basis, levying heavy fines for excess output. At times, as in periods during 1818-19, 1820, 1822, 1826 and 1829, failure to agree the sub-division of the vend between collieries led to open trade [ibid., p.263]. The regulation of sales referred only to "sea-sale" coal, that is to coal transported by sea rather than by land. However the North-East's principal markets were "sea-sale" being mainly along the east coast and in London. In supplying these markets the North-East coal field produced about 3 million tons of coal in 1775, c.34 per cent of national output, and about 7 million tons of coal in 1830, c. 23 per cent of national output. However in 1830 the North-East "was still the acknowledged leader in technology, in the skill of its miners, and in the expertise of its managers" [ibid., p.28]. Members of the senior managerial class were known as "viewers", a term derived from the verb "to view", that is to survey, a colliery. In the North-East the term viewer was applied to colliery managers, in the paid employment of the owners, and also to independent professional experts who provided their services on a freelance basis. Essentially, the task of an employed manager was to run the day-to-day operations of the colliery, whilst the independent professional "advised and directed larger issues of colliery design, construction and development" [ibid., p.58]. Professional viewers "were a mixture of manager, engineer, surveyor, accountant and agent" [ibid., p.59] and attracted their own "schools" of assistants and apprentices. There were three great schools in the North-East at the beginning of the nineteenth century: those of Buddle, Barnes and Johnson. Buddle was "the doyen" [Burgess, 1986, p.15], being viewer, agent, consultant and part-owner in many of the region's leading collieries. Furthermore, from 1806-1831 Buddle was secretary to the Tyne Committee of the Joint Association and at times represented very powerful interests on the Wear Committee. Although the constitution of the Joint Association

allowed for democratic management, the extent to which it could be dominated by one man should not be underestimated....(Given) his immense reputation....(it) must have (been) very difficult to offer serious opposition to Buddle on either committee [Flinn, 1984, pp.261-2]

It is clear that Buddle was the dominant coal-mining professional of his era, and, in the midst of heavy, wide-ranging professional responsibilities, he chose to act as viewer and manager at only two collieries: at the mighty Wallsend Colliery and at the relatively minor Tanfield Moor Colliery [ibid., p.59]. Whereas Wallsend Colliery was owned by residents of the North-East who at times inter-linked ownership of Wallsend with partnerships in other collieries, Tanfield Moor was owned throughout Buddle's management by a single individual, William Morton Pitt, who lived far away in the South-West of England. Thus, the archives relating to Tanfield Moor Colliery, housed at the Northumberland Record Office (NRO) and the Durham Record Office (DRO), provide a unique opportunity to analyse the roles of accounting and costing in the context of Buddle's management and in the context of the principal-agent relationship of Pitt, the absentee owner, and Buddle, the on-site manager.

ACCOUNTING AND COSTING AT TANFIELD MOOR COLLIERY

Introduction

Based on a detailed study of the coal-mining industry of the British Industrial Revolution, Fleischman and Parker [forthcoming] are set to overturn their previous expectation [1991, p.363] that "nascent cost accounting would flourish more notably in factory environment" than in extractive industries. Following particular searches in the archives of the North-East England coal industry, their forthcoming study will help to bring to a wider audience the wealth of this specific element of Britain's cost accounting heritage. Until now, this heritage has not been subject to great scrutiny by accounting historians but has long been used as a basis for studies by economic historians [e.g. Ashton and Sykes, 1964]. Recently Hatcher [1993] has noted that accounting and costing have long been of great importance in the British coal industry in general and that of the North-East in particular. Having examined the archive evidence

Hatcher stated [p.305] that, prior to 1700, colliery accounts, whatever their deficiencies, were "among the most advanced of all forms of contemporary business accounts" and conclude [p.306] that

few colliery accounts did not permit output, sales, costs and revenues to be calculated and mapped..... (and) information extracted from accounts could provide a serviceable basis for weighing the prospects of future ventures. Of the higher order data, cash flow was also normally discernible, and so too was the balance between output and sales, the average cost of producing each unit of coal, and the average profit from its sale. Bookkeeping as practised by very many collieries, in all its eccentricity and lush profusion of styles, was a serviceable tool of management.....

The Hatcher study is a work of a economic and social history that provides valuable early surveys of accounting and costing that indicate that these disciplines were well established in the British coal-mining industry prior to the Industrial Revolution. Thus the current work on accounting and costing in Tanfield Moor Colliery during the Industrial Revolution is set in the context of a developed and widely employed knowledge base. However by focusing on one specific colliery the current work can provide a wealth of a detailed evidence to add to the rather more generalised picture built up by the extant economic histories.

Tanfield Moor Colliery

The Pitt family, who lived in the South-West of England, claimed to have purchased Tanfield Moor Colliery in 1690 [NRO Bud/22, p.150]. The Pitts were absentee owners, who relied upon others to manage the colliery for them. It is probable that in the late 1700s the colliery was managed on behalf of the Pitts by a family of local viewers, the Browns, who had conducted a "view" of Tanfield Moor in 1764 [NRO, WAT 2/5, p.32]. In the Browns' "View Book" [NRO, WAT 2/5] there is a run of fortnightly reports for Tanfield Moor, dating from December 1776 - July 1778. Essentially these reports consisted of a listing of payments and a physical reconciliation of stocks, production and sales, and were prepared for "the use of John Pitt Esq.", the absentee owner of the colliery. The reports enable current researchers to gain some indication of the opera-

tion of the colliery. The reports indicate that while the colliery was owned by Pitt and its viewers were the Browns, the mining of coal was undertaken by two contractors, James and William King, this form of mining organisation being widespread in the North-East between 1780 and 1815 [Taylor, 1960]. The colliery was the overall unit of organisation, and contained two different pits, "the Willey pitt" and "the Brook pitt". As was common practice, over time individual pits were worked out and new pits opened within the continuing operations of the colliery. From the pit, the coal was transported to the staithes, or loading points, on the River Tyne whence it was shipped down river on keel boats and transferred at sea to colliers which sailed down the East coast to sell the coal mainly at the London markets. In a draft pro-forma report of the 1790s [NRO Bud/22, pp.44-45], the system for reporting physical flows of coal was reformulated and a model "general" account developed to record transactions with the "fitter" (sales agent) and for cash. However, there is no evidence of either of these systems being used in practice. Nevertheless, the model general account does contain information on cash balances, receipts, payments and remittances to the owner that would probably have been of great value to an absentee owner.

As an absentee owner, Pitt was particularly reliant upon his on-site managers. Much of Pitt's period of ownership was dominated by two on-site managers, Nathaniel Clayton, Agent from 1800-1822 and John Buddle, who was Pitt's Agent from 1822-1836. Since the relationship between Pitt, on the one hand, and Clayton and Buddle, on the other, are clearly relationships between a principal and his agents, relevant elements of the agency literature are now reviewed in order to provide additional context prior to the detailed examination of Tanfield Moor's accounting and costing archive. Jensen and Meckling [1976, p.308] define an agency relationship as a contract under which the principal engages the agent to undertake work on his behalf whilst delegating some authority for decision making to the agent. They note that, at times, the agent may act to further his own interest rather than that of the principal, and that the principal can act to limit such tendencies by offering appropriate incentives to the agent and by using monitoring systems designed to limit deviant activities by the agent. The agent may incur bonding costs to guarantee that he will not undertake certain actions which would harm the principal or to ensure that the principal would be compensated for any such actions.

However despite incentives, monitoring and bonding, the principal may suffer "residual loss" because of divergence between the agent's decisions and the decisions that would maximise the welfare of the principal.

Principal-agent relationships were at the core of the "Memorandum of Agreement" [NRO Bud/22, pp.37-40] made in 1800 when William Morton Pitt appointed Nathaniel Clayton of Newcastle as "his agent for the Management of his Colliery called Tanfield Moor...and his....Agent for selling the Coals thereof." Under the terms of the agreement, Clayton was to:

- execute a bond of £5,000 to Pitt as a safeguard for his fulfilling the terms of the agreement;
- keep "truly and faithfully" accounts of all his receipts and payments and render such accounts to Pitt or his representatives whenever required;
- remit to Pitt or his representative any surplus cash not required to cover current expenditures, together with the relevant cash account;
- present fortnightly reports of expenditures and physical flows of coal; and
- present yearly cash accounts, within one month of the year-end, and pay any surplus cash balance to Pitt.

In return, as his part of the agreement, Pitt was to:

- pay Clayton £562 per annum to cover selling expenses;
- cover all colliery expenses, except those connected with selling; and
- pay Clayton for his services by means of a fixed sum of £400 per annum plus a further £12 "for every One Hundred Pounds remitted...as profits....over and above the Clear Annual Sum of Three Thousand Three Hundred and Thirty Three Pounds, Six Shillings and Eight Pence.

Under the agreement, Clayton was to have control over all personnel, but the books of account were deemed to be Pitt's property to be passed to him or his representatives on demand, although Clayton was free to make copies. Thus the Memorandum of Agreement was a clear contract between principal and agent and it indicated that the accounting system was the key to the way in which Pitt, as principal, sought to protect his interests. The Memorandum indicates Pitt's intention to use the accounting system as a means of obtaining information on the colliery and its cash flows, and as a means of providing appropriate incentives to his agent. Unfortunately gaps in the archive prevent an analysis of how this principal-agent relationship ac-

tually worked in practice. However, this arrangement continued until 1822 when concerns over the financial performance of the colliery and Clayton's effectiveness as Agent prompted Pitt to engage the services of John Buddle.

John Buddle

It is apparent that Buddle was aware of the moral hazards involved in principal-agent relationships and that he had clear views on setting incentives for agents. In 1813 he reported [NRO Bud/6, pp.61-2] to the owners of Water-house Colliery in Lancashire on profits that had failed to meet expectations:

My surprise (at the low profits) subsided in a great measure, on being informed that the managers of some of the principal Collieries were allowed a premium on the number of Tons sold Yearly - not on the Profits....I don't wonder that the Price of Coals has been reduced from time to time, nor that it should still continue to be reduced, until such an absurd practice is abolished. Under this System, the interest of the Colliery proprietors and that of his Agent are completely at variance, and it is too much to expect of human nature that the Agent is to sacrifice his own interest to that of the employer. If an Agent is to be allowed any extra remuneration, at all, over and above his Yearly Salary, it ought surely to be on the Profits made not the quantity sold.

The Tanfield Moor archive does not reveal any arranged or actual incentive payments to Buddle, and, apart from a "simple Money Bond" [NRO Bud/22, p.91] of £4,000 made by Buddle on taking up his post, does not contain any formal agreement made between Pitt and Buddle for the regulation of their relationship. Whether or not such an agreement ever existed, Pitt probably counted himself fortunate that Buddle agreed to accept this commission, given Buddle's pre-eminence in the coal industry. In Buddle, Pitt had obtained an agent of the very highest reputation. The impact of reputation in principal-agent relationships has not yet been subject to a great deal of scrutiny, but does have "potential implications for managerial accounting research" [Baiman, 1990, p.357]. Baiman argues that relationships between "reputable" individuals have distinct benefits over those between individuals without such reputations, including the reduction of the costs of drawing up contracts and collecting information, as well as by "increasing the set of

supportable actions." In a "reputable" relationship, the agent will be careful to maintain his reputation, since, *inter alia*, it affects his future earning power in other relationships, and the principal will act fairly as this helps him to secure the services of an agent with a reputation for profitable management and integrity. The acquisition of an agent of Buddle's reputation must be seen in the context of an industry where fraud and corruption were rampant. Reviewing the period up to 1700, Hatcher [1993, p.304] noted that major determinants of colliery profits were not only the owner's ability to track output and cash and to impose efficiency, but also his ability to limit fraud: the "control of fraud undoubtedly absorbed a disproportionate amount ofenergy and ingenuity." This concern continued to be a major pre-occupation in the coal industry throughout the period of the current study, and, in a letter to Buddle in 1824, Pitt [DRO NCB 1/JB/1090] referred to two recently published treatises on the "abuses", "impositions and frauds" practised in the coal trade, and commented that "both (authors) assert, that more deception and cheating is practised on Tanfield Moor Coal in London than on any other." However, it is apparent that Buddle's reputation caused Pitt to place a great deal of faith and trust in him, and to delegate wide decision-making powers to him. In the matter of negotiations with Clayton over "fitting" fees, Pitt [ibid/10880] wrote to Buddle in February 1824, "I hope you will gain your end in the negotiations with Mr. Clayton, pray let there be no reference to me, - you have carte blanche." Although, in May 1824, Pitt [ibid/1089] did suggest that Buddle should reach a compromise with Clayton, this was one of the very few occasions when he made a direct contribution to the management of Tanfield Moor affairs. Virtually the whole of Pitt's correspondence to Buddle [DRO/NCB/1088-1133] consists of requests for the remittance of funds and with Pitt's own personal financial situation. Pitt showed almost no interest in the operation of Tanfield Moor as a colliery or as a business venture; essentially he was interested only in the cash flow he could generate from Tanfield Moor. In practice, Pitt delegated full decision-making authority to Buddle; as he wrote [ibid, p.1127] in 1830 in response to a minor management recommendation made to him by Buddle, "Any recommendation of yours has a claim to adoption on our part."

Just as Pitt was prepared to delegate to Buddle, so Buddle was prepared to take the initiative in his dealings with Pitt. Whereas Pitt had imposed reporting and financial arrange-

ments on Clayton, Buddle [NRO Bud/22. p.86] took the initiative in setting out the arrangements that *he* considered satisfactory,

I have.....found from experience that the more my employers know of their own affairs and my manner of acting in them, the more comfortable and satisfactory it is to myself. I am therefore desirous in undertaking the trust, which you have so kindly reposed in me, to establish a system of management, and correspondence, which may keep you in regular communication with your affairs in this quarter - not to teaze you with trifling matters but to give you sufficient information on all material points.

In his review and analysis of the agency literature, Baiman [1990, p.363] addresses the question as to why the principal would ever find it in his best interests to delegate the choice of monitoring system to the agent. However, there is no evidence that, at Tanfield Moor, Pitt used the accounting and costing systems to monitor Buddle. The word "trust" appears to be a highly significant word in the context of this particular principal-agent relationship and the trust engendered by Buddle's reputation is an important theme running throughout the current research. Thus both parties felt secure enough to allow the agent, rather than the principal, to implement not only accounting arrangements but also banking procedures. At the outset, Buddle gave Pitt details of the banking arrangements he proposed to make and set out his plans to prepare a bank account for Pitt every 28 days, noting that the monthly cash flow would also provide "a tolerably accurate criterion of the actual profit of the colliery" [ibid, p.87]. Buddle set up this system of accounts [NRO, Bud 37/1-6] and, every 28 days, provided Pitt with accounts detailing transactions and balances with the coal-fitter and with the bank. Additionally, Pitt was provided with a statement showing period and cumulative sales to the coal-fitter, in physical and financial terms, a summary abstract of the bank account and a detailed abstract of cash payments in the period. Thus Buddle himself designed and operated the accounting system he used in reporting to Pitt. However, from Pitt's viewpoint, useful checks were built into the system. Transactions with the bank and with the coal-fitter could, if required, be checked easily and independently of Buddle and at frequent, regular intervals. Although Buddle's monthly accounting system was not particularly innovative, as it simply built

upon and extended Tanfield Moor's existing systems, it did provide the absentee owner with information relevant to obtaining an overview of the business and its financial position, as well as checking up on his agent, although there is no evidence that Pitt ever used the information in these ways.

It is apparent that Buddle was highly trusted, for in 1823 Pitt agreed to Buddle's tactfully worded suggestion [NRO Bud/22, p.174] regarding the format and preparation of annual accounts:

It occurs to me that as good a Plan as any of choosing the Colliery Acc^{ts} for the.... year will be to make out a Cash Account folio, a journal (and) a profit and loss Acc^t. The former will show the Cash Balance at the end of the year, and the latter by giving credit for all debts due, and charging all debts owing, will give a correct view of the Year's Profit....I shall however be very glad to adopt any other mode or form that you may prefer and shall feel obliged by any suggestion.... you (make) on this subject. Simplicity and clearness is what we ought to aim at, and by a little attention I hope we shall succeed...and in looking forward to the making up of the Yearly Book it has occurred to me that Mr Watson would be as proper a person as any other.

Given that Buddle was responsible not only for the design of the annual accounting system, but also for the choice of the accountant who would undertake the preparation of accounts, Pitt appeared to repose a great deal of trust and confidence in him. The information supplied to Pitt in accounting form was supplemented by that contained in letters written to him by Buddle [NRO Bud/22]. The correspondence is voluminous and is biased in quantity, perhaps not unnaturally, towards the early years of the principal-agent relationship. However, the letter book is probably incomplete in that Buddle acknowledged to Pitt in 1824 that "I very seldom have an opportunity of keeping copies of my letters to you" [ibid, p.186]. Despite the fact that Buddle had established the system of reporting to Pitt by accounts and by letters, it is apparent that he did not feel constrained by it. It appears that although the accounts were always prepared and sent to Pitt, at times the letter-writing was limited, as Buddle noted to Pitt in 1827 [ibid, p.234]:

It is now so long since you received a letter from me, that I am afraid you will begin to think me an idle fellow. The fact however is that I am more remiss in

writing than in acting - when I cannot manage both, the former "goes to the wall" and the latter has my exclusive attention.

Thus the letter-writing system was not a rigid requirement imposed on the agent by the principal, but a method of reporting that the agent used at *his* discretion. Although the letter book is probably incomplete, it is possible to gain from it an understanding of Buddle's concerns in the management of Tanfield Moor. There were four major areas of importance: production, sales, transport and financial management. The current research examines each of these areas and assesses Buddle's use of costing and accounting information in dealing with them.

Production: In the late eighteenth century coal was extracted from Tanfield Moor by contractors. Although it cannot be dated precisely because of lack of archival evidence, this form of mining organisation was ended at Tanfield Moor by 1822 [NRO, Bud 37/1]. Generally the practice had died out in the North-East by 1815, largely due to contractors' tendencies to exploit pits for their own short-term gains rather than the long-term benefit of owners [Taylor, 1960]. Thus Buddle was responsible for the direct management of the colliery workforce. Despite the fact that production was naturally of considerable importance at any colliery, Buddle spent remarkably little time reporting on it to Pitt, probably because it was a relatively problem-free area of colliery operations. In 1825, Buddle [NRO, Bud/22, p.190] wrote to Pitt noting "I am happy to say that the state of the colliery underground is highly satisfactory" and in 1827 [ibid, p.231] he commented that, as regards production, "we are going on very well." Although the preparation of production cost analyses was a well-established practice in the North-East England coal mining industry, and such costings existed at Tanfield Moor as early as 1749 [NRO, Bud/25,p.31], Buddle devoted little costing effort to this area. Such costing was "extremely complicated" [Flinn, 1984, p.286] and Buddle may have decided not to undertake it, given his expert judgement of the satisfactory state of production matters and the very limited amount of time he could spend on Tanfield Moor's affairs. Buddle's satisfaction with mining operations may have been based not only on the expertise with which he directed them, but also by the way in which they were carried out by miners he selected and hired at the annual "binding". The management of labour relations in the coal mining indus-

try of North-East England was an extremely difficult task. At times bindings and pay negotiations involved miners in strikes, lawlessness, carrying guns, physical violence and killings; coal owners backed their negotiations with the draconian penalties of the established legal system and the use of the militia [Jones, 1986]. Buddle was a key figure in the industry and, as a negotiator for the coal owners was an obvious target for the wrath of the mine-workers. However, he also inspired the respect and admiration of the workers. At times this proved rather overwhelming, as in 1831 when he helped in the successful resolution of a bitter pay dispute and the workers wanted to carry him shoulder-high in procession from his home in Wallsend to Newcastle the regional capital five miles away [Colls, 1987, p.92]. Buddle won the respect of the "pitmen" not simply because of his managerial abilities, but for his attitude towards them and their work. He attached importance to the skills and qualities required of a "pitman" and maintained a strong commitment to pit work. Although the region's other leading viewers no longer went underground in pursuit of their duties, Buddle continued to do so and after major accidents insisted upon being among the first to go down the pit to review the situation. Thus although Buddle's production costing at Tanfield Moor was somewhat limited, it is probable that he more than compensated for this by the way in which he undertook the direct management of the labour force.

Sales ("the vend"): Between 1805-1830, the Joint Durham and Northumberland Coal Owners Association regulated "the vend" or sale of coal by fixing prices and establishing quotas for each colliery. In order to get their coal to market, the owners hired independent shipping agents, known as "fitters", who owned keels that transported the coal from the staithes down the River Tyne to waiting colliers. The fitter engaged the master of the colliery to carry the coal to market, often down the East coast to London. At times competition between coal-owners caused the system of regulation to break down, and open or "fighting" trade ensued. During these periods of open trade the formal regulation was replaced by a more flexible system known as "freighting" which entailed the shipment of coals to market and sale at whatever price could be obtained. The vend was all-important to Tanfield Moor's success. As Buddle noted [NRO, Bud/22, p.191] since underground affairs were highly satisfactory, "our prosperity ... will depend entirely upon the extent of our vend." However, Buddle was faced with funda-

mental problems in this sphere of his management as there was a limited demand for the type of coal mined at Tanfield Moor for, while much of the success of the North-East coal industry was based on high quality household coal, Tanfield Moor produced soft coal used by specialist manufacturers. This demand was limited at the best of times and even more so during recessionary periods such as those which saw the colliery's sales fall from approximately 17,000 chaldrons in 1831 to just over 13,000 chaldrons in 1833, a chaldron weighing approximately 6,000 pounds [Hiskey, 1978, p.73]. In these circumstances, Buddle was forced to use "freighting" as a means of maintaining sales. However when prices fell to particularly low levels Buddle [NRO, Bud/22, p.333] reported to Pitt that "to have pushed the vend under such circumstances would have been absolutely ruinous. I was glad therefore to work no more coals than barely necessary to occupy the establishment and allow the workmen a maintenance." Buddle did not refer to any financial analysis to support this decision and the archives do not contain any such explicit assessments. However, the regulation of the vend had a dramatic impact on selling prices. In 1834, freighting prices were 15s 3¹/₂d per chaldron, but, after the restoration of the regulation of the vend rose to 20s per chaldron. Nevertheless, Buddle did have the ability to influence sales price and volume by his management of the marketing system. For example, in 1835 he decided to consign all of Tanfield Moor's coals to one London factor rather than to several, and, as a result of the concentration of business and the greater care and attention given to Tanfield Moor by this single factor, the coals began to sell at their full nominal price of 24s per chaldron, although Buddle still had to exercise discretion over the quantity of coal to send to the market [Hiskey, 1978, p.74]. Although the fortnightly reports may have enabled Buddle to keep very close track of vends and prices, there is little extant evidence to suggest that he employed more detailed ad hoc revenue-cost analysis in his sales management. Nevertheless, Buddle was capable of using cost data when he thought it necessary; for example in his negotiations with Clayton regarding the latter's "fitting" fees, he reported [ibid, p.123] to Pitt:

I took my particulars of my Estimate of the Cost of the Fitting Establishment; and wished Mr Clayton to discuss it item by item; but he was not sufficiently with the minutiae of the business, to enable him to do

so....if he can satisfy himself that my estimate is correct, he will be satisfied with it.

However, underlying all the spheres of sales revenue and cost management lay the issue of corruption. The entire process of the coal industry, from mining through to distribution and marketing, created potential for abuse by agents. Some agents' "perquisites" were accepted throughout the industry: for example viewers supplied owners with corving rods, used to make baskets for hauling coal underground, and in doing so made a profit for themselves. Buddle noted, perhaps somewhat coyly, that the costs of corving rods was "one of the *secrets and mysteries* of the profession" [quoted in Flinn, 1984, p.62]. However, although this benefit may have been viewed as legitimate, others were more suspect. When coal was sold in the London market, it went through a complex handling and marketing system that "creaked with corruption" [ibid, p.279] and systems nearer home were equally unsatisfactory. Buddle believed that fitting agents' clerks encouraged the use of freighting in order to obtain substantial corrupt payments from shipmasters whose colliers would otherwise have been idle. He considered freighting to be "a woeful practice, being injurious to the Trade at large as well as to the parties immediately concerned, and ought to be abolished" [ibid, p.272]. In 1823, Buddle complained to Pitt that Clayton had taken unilateral action in confirming the colliery's agents on the London market "as much ... for the purpose of personal friendship, as for benefiting the Interests of the Colliery" [Bud/22, p118]. Given that Buddle had previously written warmly of Clayton [ibid, p.97] it appears unlikely that this comment was generated by personal ill-will, but was simply a reflection of the moral hazards inherent in the industry's principal-agent relationships. In such circumstances, Buddle's outstanding reputation within the coal industry and his ability to inspire trust and confidence formed a valuable element of the principal-agent relationship.

Transport: In the early eighteenth century, mining in North-East England was concentrated in a limited area of the upper River Tyne and its southern tributaries, the Rivers Derwent and Team [Flinn, 1984, p21]. This concentration was due to geographical, geological and technological factors: coal deposits could be worked in shallow mines sunk into steep valley sides that allowed the natural drainage of water, other practical means of drainage not being available. By the early eighteenth century these shallow mines were almost worked out,

and the coal-field was gradually extended towards the high land of the Tanfield area. Coal was plentiful in this area, but the geography of the land did pose fundamental problems. A system of waggonways was necessary to transport coal to the Tyne, but "the configuration of this hilly country is such that these waggonways were inevitably channelled into the Derwent valley, a bottleneck in which wayleaves (permission for transport) could be controlled relatively easily by a small number of landowners" [ibid, p.22]. A coal-owning partnership known as the Grand Alliance operated in the North-East, and the Allies often bought land and rented wayleaves "for the sole purpose of denying them to competitors" [ibid, p.41]. One Ally, Lord Ravensworth, controlled wayleaves vital to the transport of Tanfield Moor's coal and, in February 1827, Buddle [NRO, Bud/22, pp.218-9] informed Pitt that the "increased...wayleave to Lord Ravensworth and others is...a heavy tax upon us. This ...has cut down the profit of 1826 most cruelly." However Buddle was willing to use his social standing to gain advantage for Pitt, a reversal of the more usual situation whereby an agent tried to generate social contacts and derive benefits from the principal's higher status and wider contacts [Cowton and O'Shaughnessy, 1991, p.40]. In 1827, Buddle was included in the social gatherings to celebrate the visit of the Duke of Wellington to the North-East and took the opportunity to develop influential contacts. Thus, in October 1827, he was able to write [NRO, Bud/22, p.235] to Pitt stating that:

I am now on terms of intimacy...with Lord and Lady Ravensworth...and don't despair of being able, by and by, to induce his lsp. to relax a little in the amot. of wayleave with which he has saddled us.

The monthly reports [NRO, Bud 37/1-6] provided summaries of actual wayleave and transport costs and, as part of his management of these important areas, Buddle also prepared detailed ad hoc costings [NRO, Bud/22, p.279] and cost estimates [NRO, Bud/22, pp.296; 301-3]. Transport costs and, hence, colliery profitability were influenced tremendously by technological development. An early instance had been the change from transport by road to movement by "rail" transport in which horses pulled coal wagons along wooden rails or "waggonways" to the staithes, or loading points, on the River Tyne. It had been estimated in 1711 that road transport from Tanfield Moor to the Tyne resulted in a profit of £1.17.6 per

"ten," a standard unit of measurement, and that transport by wagonway would increase profit to £5.5.9 per "ten" [Flinn, 1984, p.149]. In Buddle's era, two significant developments in transport technology were the development of railways and the use of "spouts" at the staithes, enabling direct loading onto colliers rather than via the intermediary of keel boats. In 1823 Buddle investigated the possibility of building a railway line to the Tyne and prepared a detailed cost estimate [NRO, Bud/22, p.126] showing a total project cost of over £39,000. However, this project was shelved, perhaps because of Pitt's lack of capital and the failure of negotiations with prospective partners [Hiskey, 1978, p.72].

Buddle continued to use wagonways to transport Tanfield Moor's coal until the early 1830s when the use of railways became a very real prospect. Buddle was the viewer for the collieries of the Stanhope and Tyne Railway Company and was involved in the calculation of the railway's quotation of 8s 3½d per chaldron for leading the coals to the Tyne and shipping them by spout. However, after receiving an offer from a rival railway company, Buddle succeeded in renegotiating a price of 6s 3d per chaldron with the Stanhope and Tyne. "The new leading charge, free of fixed annual wayleaves...amounted to a 4/- reduction per chaldron on the old leading costs" [ibid, p73]. Buddle [NRO, Bud/22, p.322] was in no doubt as to the importance of this arrangement, claiming that "it amounts to a renovation of the colliery, and will I trust enable it to live." Thus, in his management of transport costs, Buddle was aided both by the costing exercises he undertook at Tanfield Moor and by his standing and influence in the coal industry.

Financial management: Buddle's continuing concern in financial management was to generate sufficient cash flow to cover the colliery's wage bills and other operational payments and to provide remittances to Pitt. However, it is probable that the requirements of Buddle's monthly accounting system also shaped Tanfield Moor's cash flows, particularly in relation to wage bills. Although it was common practice in the North-East to pay colliery workers on a fortnightly basis, Buddle [NRO, Bud/22, p.87] chose to introduce a variant to this system:

...28 days is named as the (accounting) period...because it its the custom to pay the colliers every 14 days; but I only mean to pay the other classes of workmen every 28 days. This will very much simplify the Cash

Acct. as I shall just have 12 monthly receipts of Mr Clayton (the fitter) and 13 lunar payments in the year.

Buddle also cited the need to maintain the monthly preparation of accounts as being the key factor underlying his acceptance of Clayton's stance in the negotiation of the fitting charge. He reported [ibid, p.160] to Pitt

You will no doubt think this rather soft on my part, but the fact is that I could not otherwise bring the matter to a close with Mr C. and might have (negotiated) on with him for the whole year which would have prevented me from Closing my Monthly Statements, in a satisfactory manner.

Buddle regarded the timely preparation of monthly accounts as a matter of some importance and aimed to have those accounts in Pitt's hands in a matter of days after the month-end [ibid, p.153]. Thus, it is clear that Buddle considered that the monthly accounts were a key element in the principal-agent reporting relationship, as well as a necessary aid to his own cash flow management of the colliery. In writing to Pitt, Buddle [ibid, p.206] sometimes forecast cash flows several months ahead and reported on his negotiations with Ridleys, the local bankers, to obtain advances and overdrafts. However, Buddle's problems in cash flow management were compounded by the nature of the regional banking system. In 1826 he reported [ibid, p.206] to Pitt:

I enclose a letter I have received this morning from our Bankers. I called upon them yesterday to make arrangements for remitting...£1,200 ... when to my great disappointment they told me it was not in their power to fulfil their promise in consequence of want of public confidence in their notes. A constant run continues upon all our Banks and Ridleys are paying away 1000 sovereigns or Bank of England notes a day to take up their own notes, which are scarcely well out of the Bank before they are bro^t back again for gold....They are afraid to pass their notes to their Customers to make the Colliery pays, and we are all under the most serious apprehension that we shall not long be able to obtain a sufficient quantity of £1 notes to pay the wages of the pitmen - as to obtaining (gold) sovereigns for the purpose, that seems quite out of the question as scarcely one is to be seen in circulation, altho' since the beginning of December the Newcastle Bank has freed

more than £200,000. The unfavourable state of affairs is compelling the Bankers to call in all their advances... the Commercial affairs of the county are getting into the most embarrassing state imaginable and we are menaced with the melancholy prospect of an almost entire suspension of business.

In these difficult circumstances, Pitt may have been comforted by the knowledge that he had entrusted his affairs into the hands of the industry's most outstanding and respected professional. Despite the vagaries of the banking system and the coal mining industry, Tanfield Moor continued in business and Buddle continued to emphasise short-term cash management in order to meet the operational needs of the colliery and to remit cash surpluses to the owner, although there does not appear to have been any mechanism to set aside funds to meet the long-term capital development of the colliery, probably because such expenditures were minimal and could be met out of current cash flows.

Cash management may have been facilitated by the credit terms available in the coal mining industry but credit arrangements may have accentuated the need for accrual accounting at the year end. In 1824 Buddle [NRO, Bud/22, p.176] noted that:

It is not customary in Colliery affairs to pay off tradesmen within the Year in which the goods are obtained... any Credit for Iron, Ropes and Prop. wood is 6 months but more frequently Twelve.

A possible implication of this particular letter is that, prior to the engagement of Buddle, Tanfield Moor Colliery had not been adopting the usual credit terms and, thus, Buddle's insistence on them may have helped to regulate cash flows. Furthermore, Buddle employed his extensive business and social network to preserve Pitt's cash resources from unscrupulous taxation officials. Buddle [ibid, p.161-2] wrote to Pitt that:

I happen to be intimate with the Surveyor General of the Taxes in this District. I spent last evening with him and asked him if any advantage would arise to you from entering your Colliery establishment in Dorsetshire (Pitt's home area). He replied certainly not....I told him that your surveyor was of the opinion that some benefit would accrue from having the whole of your establishment, Colliery and all, in one return. He replied that the only person who could be benefited....

would be the surveyor or collector himself whose percentage would be increased by the augmentation of the tax schedule.

Thus, in terms of financial management, Buddle brought valuable knowledge, contacts and authority to bear in the pursuit of his principal's interests, in addition to implementing a monthly accounting system that aided financial management and reporting to the principal.

The annual accounts were employed little in the management of the colliery, but did keep the principal informed of annual profit or loss: 1824 £6,374; 1825 £4,490; 1826 £3,747; 1827 £5,591; 1828 £2,934; [Flinn, 1984, p.321] 1829 £107; 1830 £1358; 1833 £774 (loss); [Hiskey, 1978, p.75]. The 1824 results reflected Buddle's first year in complete effective control of Tanfield Moor and Pitt expressed his thanks for Buddle's "extraordinary exertions" and his "real surprise" at the amount of profit. The declining level of profits from 1829 onwards were due largely to the marketing and pricing problems caused by recession and the decline in the "Regulation of the Vend" [ibid, p.75].

CONCLUSIONS

At Tanfield Moor, accounting systems were developed to ensure regular, routine reporting by the agent to the principal and to provide useful management information to the agent. As agent, Buddle also prepared ad hoc costings to help him deal with specific problems, for example in transportation. However, where he judged operations to be satisfactory he did not employ cost data. This non-use of cost data was probably a deliberate choice on Buddle's part and is not indicative of any lack of knowledge or ability in handling such data. Thus, the current research does indicate that accounts were used as direct aids to management at Tanfield Moor, and, taken in the context of the well-established and widespread accounting and costing practices of the North-East England coal-field, does challenge Fleischman and Parker's expectation that "nascent cost accounting would flourish more notably in a factory environment" [1991, p.363] than in extractive industries. The current author's preliminary surveys of the Northumberland Record Office and the Durham Record Office, and reading of the existing literature [Flinn, 1984; Hatcher, 1993; Oldroyd, 1996] suggest

that further research [e.g. Fleischman and Parker, forthcoming] might overturn this expectation.

Principal-agent relationships were vital to organisational control at Tanfield Moor, and the systems of accounting, costing and correspondence combined to keep the principal well apprised of his agent's management of the colliery. However a distinctive feature of the relationship between Buddle and Pitt was the freedom the agent had to develop systems and take managerial decisions that he thought were appropriate. There is no evidence that Pitt ever used any of the available information to monitor Buddle in any way. At the heart of this relationship was Buddle's reputation and the authority of Buddle as an expert and as a man. It has been argued [Otley, 1980] that accounting is simply one feature in the control structure of an organisation and that this control structure also includes features such as personnel selection. In the case of Tanfield Moor, the appointment as agent of a man of Buddle's reputation lay at the core of the control structure and was probably of greater significance than the development of systems of accounting, costing and correspondence.

The findings of the current research may be related to research undertaken on more recent control structures in coal mining. After World War II, the British coal mining industry was nationalised and a National Coal Board [NCB] was formed. Berry et al [1985] conducted a study of an area of the NCB during the early 1980s and found that although financial planning and control systems existed they were not the primary form of organisational control. Production and technological considerations were in the forefront and a set of cultural rather than financial values pervaded the organisation, emphasising the loyalty and support of managers for miners who did a difficult job in dangerous conditions. However, by the mid-1990s, the privatisation program of the Conservative government had ensured dismemberment of the nationalised industry and the restoration of private ownership. A potential avenue for future research might involve an examination of any changes in financial, organisational and cultural value systems consequent upon the privatisation of the British coal-mining industry.

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