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New Lanark : The New industrial Architecture of the Industrial Revolution

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In a conference, the theme of which is contemporary industrial architecture, it may not seem particularly relevant to look at a factory village which has not changed in its essential appearance for more than a century. But today's new architecture is tomorrow's old, and this truism means that re-examining complexes like New Lanark is by no means irrelevant. The principles which govern the siting of industry, recruitment and retention of a suitable workforce, the delivery of power where it is required, and the provision of an appropriate working environment do not change. Nor do the non-economic, or not immediately economic concerns of the entrepreneur change: the wish to express prestige of function, or enlightenment of thought, or sheer economic or political power, often influences the ways in which industrial buildings are sited and designed. The Saline Royale is an extreme example of prestige of function and political power expressed in architecture. New Lanark is very different in most respects, but it shares with the Saline Royale the idea that the buildings to house industry and its workforce should be more than simply adequate to perform the necessary technical tasks. Both are in their own way expressions of the "enlightened rationalism" that France and Scotland shared in the late 18th and early 19th centuries. This paper addresses some of the evidence that New Lanark was more than just another cotton mill village, and tries to put it in the context of contemporary industrial development in Britain.

Firstly it may be useful to set the scene a little. New Lanark is on the southern edge of lowland Scotland, about 40km from Glasgow and Edinburgh. The site of the village is in the gorge of the River Clyde, on a stretch of the river where it has cut through soft rock, but where ridges of harder rock have created a series of waterfalls. In the 1920s a hydro-electric power scheme drew water from the most spectacular of the falls, reducing their dramatic appeal, but before that time the "Falls of Clyde" were renowned throughout Europe as visitor attractions - something that the well-informed and wealthy ought to have seen. Thus even before the mills had been contemplated, the site was a public and prestigious one. From a practical point of view the site was also outstandingly good. Nowhere else within reach of the east and west coasts of Scotland was there such a dependable source of water power, for the River Clyde has a vast catchment among the hills to the south, an area with a high rainfall. As with the older iron industry, using charcoal as a fuel, the dependable flow of water was very desirable for the processes New Lanark was intended to exploit.

These processes were those brought together by Richard Arkwright in the late 1760s and early 1770s for the mechanical spinning of cotton. The goal of a successful method of spinning cotton mechanically had been pursued actively by many individual inventors for several decades, and many, if not all of the ideas embodied in Arkwright's successful

package of processes had been maturing before he drew them together. His most celebrated invention was the "water-frame", in which pairs of rollers were mounted in sequence, each pair revolving faster than its predecessor. By adjusting the distance between the rollers and the differences in speed, the fibres of cotton could be drawn past each other without the stream of fibres breaking. Finally the thin stream of fibres was locked together by twisting to produce, in principle, a strong, even yarn.

To produce such a yarn, however, the water frame had to have a supply of fibre of even high quality, and this Arkwright addressed in his patented drawing frame and carding machine, with "crank and comb" mechanism. The carding machine produced a loose sheet of parallel fibres, which could be drawn into a rope, also loose. This rope would then be drawn out to a fine, slightly twisted, stream of fibres suitable for use in the water frame. All three mechanical processes were vital to the success of Arkwright's system, as were the hand preparation of the raw cotton and the mechanical preparation of the finished yarn into saleable packages. The effective management of the process required a level of supervision that could not be given if the individual stages were "put out" to domestic workers, as was contemporary practice in the textile industries. So Arkwright developed the factory, or spinning mill as a technical and organisational unit. Before he had fully realised the whole package of processes he built small horse-driven mills, but the fully-fledged process needed more power, and power more evenly delivered, than horse power could offer. So Arkwright moved to the best water-power sites available to him in the Midlands of England, close to where his existing business interests lay. These were in Derbyshire. He did not, however, have to begin to design large water-powered mills from first principles, for silk throwing had been established in Derby by Thomas Lombe in 1721, and in Congleton, Cheshire, in 1753. These mills had central water wheels driving horizontal shafts, with vertical shafts geared to them to power individual silk-throwing frames, built on an Italian model. Arkwright must have been aware of these mills, which offered a very suitable pattern for him, both functionally and architecturally. The major differences he had to accommodate were the much greater power required by his processes, especially carding, and the need to have power delivered horizontally on each floor of the mill.

Arkwright seems to have resolved these problems perfectly satisfactorily, for his first large water-powered mill, at Cromford, was quickly followed by others, both licensed by him, and unlicensed. By the early 1780s, "pirated" mills were seriously threatening his position as owner of the key patents, and with rivals anxious to break the patents, he first of all sought to defend them. As a second line of defence, he began to try to sell his package of processes to men of suitable financial status and commercial probity.

This was what brought him to Scotland, and to connections with David Dale, a linen merchant on an international scale, and a banker in Glasgow. As agent for the Edinburgh-based Royal Bank of Scotland, Dale had impeccable financial credentials, and he knew the most important Scottish textile trade - linen - very thoroughly. He was also a man of culture and a rational thinker, mixing in Edinburgh society as well as being a focal point in Glasgow social circles.

Dale would have most certainly known of the Falls of Clyde, and he almost certainly knew the owner of part of the site of New Lanark, Lord Braxfield, a judge in the Supreme Courts, who would come to Glasgow on circuit. So when Arkwright came to Glasgow and explained to Dale what was needed as a site for one of his mills, the latter was very well placed to deliver the best possible site, able to supply enough water power for a large spinning complex. Of equal importance, New Lanark was reasonably close to Greenock, a port with close commercial contacts with the areas in the West Indies where cotton was grown, and to Leith, the most important port in Scotland for trade with Europe, a likely market for cotton yarn and cloth. Dale also had the commercial connections, which would enable him to integrate cotton spinning easily and firmly into his existing business empire.

Returning to the choice of a suitable architecture for the mills, Dale was able to draw on Arkwright's experience. The first and second mills at Cromford, and the Masson Mill at Matlock Bath had all been built by the time Arkwright came to Scotland. Masson Mill was, like the site of New Lanark, in a place of considerable natural beauty, and had been designed with Palladian windows in a centrally set stair tower, giving it a grace which the Cromford mills lacked. It was this model that Dale chose, but it was significantly reworked for the first mill at New Lanark, which had Palladian windows, but of more architecturally correct proportions. It incorporated, too, a window taken from the baths in Rome of the Emperor Diocletian, and a centrally placed bellcote, classically treated. The waterwheels (three driving two shafts) were internal at New Lanark, giving a very clean design. The effect was to change what had been a rather provincial mill in Derbyshire into a mill that fitted well into the informed, European polite taste of late 18th century Scotland. Not only was Mill One correct in itself, it was also the model for a second Arkwright mill, and when two more mills were added in the 1790s the design framework was carried through into their construction.

This consistency and good proportion would of itself have significantly differentiated New Lanark from English – and indeed most Scottish rivals. But it was not only the mill buildings that received Dale's full attention. Apart from a few very basic cottages in the centre of the village, which were replaced in the late 1790s, the houses Dale built at New Lanark had the same clarity, consistency and good proportion in their design as his mills. Here the inspiration was drawn in principle from what Arkwright and others had done in Derbyshire, in providing solid, good quality stone houses for at least a proportion of the workforce. Whereas the Derbyshire housing drew on traditional vernacular building styles of the area, Dale's houses were based on advanced Scottish practices. The Board of Ordnance barracks at Fort George, built from the late 1750s, are, I believe, the ultimate Scottish precursors of the New Lanark houses, but a more immediate parallel exists in two ranges of houses in Inverary, in the western highlands of Scotland. They were put up for the lower orders of people displaced when the town was relocated in the 1770s. If Dale was not aware of these personally, there would certainly have been those in his circle (including Lord Braxfield, his landlord) who would have known of them.

Eighteenth century Scotland was tightly-knit socially and intellectually, though by no means insular, and with a general interest in "improvement" and in rational thought the diffusion of ideas about architecture and planning is likely to have been rapid. One family of architects is likely to have been particularly influential, and that is the Adams, the second generation of which, the brothers James, John and Robert all had fingers in many architectural and planning pies. I incline to the view that Robert and James, who developed a Glasgow connection, involving David Dale, in the 1790s, almost certainly had an input into the design of New Lanark. The Diocletian window, a Robert Adam speciality which is absent from English and other Scottish parallels, is highly suggestive of this connection.

This is all very tentative, but I believe circumstantially convincing, and brings the architectural development of the village up to 1800, when Dale sold out to a partnership headed by Robert Owen. This partnership took over a complex with two strong complementary aesthetics, both based on classically-inspired rationality of design, but only marginally classical in detailing. Over a 25 year period Owen, with a variety of partners, imposed a slightly glossy, and definitely more overtly classical, pattern on the village. Apart from the "Nursery Buildings", built to house poor-law apprentice children displaced from their original accommodation in Mill Four, and a bow-fronted counting house, all Owen's buildings - the New Institution for the Formation of Character, the School for Children, the Mechanics' Shop and the rebuilt Mill Three - had pediments with round or oval openings, and the New Institution had a columned portico. He also added the pediment to New Buildings. These additions and alterations reinforced strongly the classical feel of the village as seen by the visitor. The regularity of the back (river side) of the village was also improved by constructing a vaulted tail-race to take the water from the wheels driving the mills to a point behind Mill One, and building a uniform series of

warehouses, the "Water Houses", on top of it. Though this was a functional improvement, to increase the efficiency of the wheels, it was clearly designed to give a more formal effect.

Dale, though a rational man in a rational age, was personally modest, and was rarely at New Lanark. Owen was generally in residence there, and took pleasure in receiving the many visitors who came to see the Falls of Clyde. These included members of both the British and foreign nobility and gentry, whose views Owen eagerly sought. New Lanark, then, during Owen's time, both became internationally known, and was adapted to reflect the increasingly international aspirations of Owen himself. Because of the physical limitations of the site, and the existing investment, Owen was unable to remodel New Lanark completely, but the ideal communities he had in mind had a degree of the classicism he expressed in New Lanark. So far as I am aware, there were no other mill communities with anything like this level of physical expression of classical rationality. The only rival, Saltaire, has a much stronger vernacular character and a greater variety of architectural style.

If Dale and Owen between them created a masterpiece of industrial building, they did so not from any coldness of motive. Dale's humanitarianism, based on his strongly individual Christian beliefs, is well documented, and Owen, whose concern for others developed before he came to New Lanark, was perhaps less sympathetic to his workforce as individuals, but worked tirelessly to improve working conditions, education and control, with the effect that when he left New Lanark he had created a mill community with a distinctive peaceful, rational ethos. The new owners, the Walker Brothers, were happy to maintain the Dale-Owen tradition, and the Somerville-Birkmyre partnership when they took over in 1881, also valued that legacy. The schooling of village children, however, had passed to the local school board after the 1872 Scotch Education Act, ending one of the most distinctive features of the Dale Owen tradition.

The modern history of New Lanark, then, can be set against a durable and effective continuity of management ethos, which only ended in the 1960s, 180 years after the village was founded. The first notable change was the decision by the Gourock Ropework Co. Ltd., successors to the Somerville-Birkmyre partnership, to end direct management of the housing in the village in 1963. In handing the housing over to the New Lanark Association for modernisation the Company freed itself from a burden, but also introduced into the village a different kind of philanthropy, that of the State. In the ensuing years local and national government funding, with some private philanthropy, was used to achieve the upgrading of the buildings at the south end of the village, but at the expense of a significant level of debt.

The decision of "The Gourock" to close down their New Lanark operation in 1968 was a serious blow, and the subsequent sale in 1971 of the mills to Metal Extractions Ltd., a firm of metal recyclers, began a run-down of the condition of the mills and community buildings that paralleled the decay of the unrestored bulk of the housing. The growing recognition of the importance of the village, focused by the Robert Owen Bicentennial in 1971, was at odds with the dereliction evident on a visit to it. The listing of the buildings as being of "Special Architectural or Historic Interest" provided a key to securing a future for them. A meeting of all the parties with some statutory or administrative responsibility for the village was held in 1972, and commissioned a feasibility study into the future of the housing in the village. This study presented a series of options, ranging from demolition of all the unrefurbished housing to "full revivification" to create a community that would be reasonably viable.

At that stage there were no positive plans for the mills and community buildings, which remained in the ownership of Metal Extractions Ltd: the priority was to tackle the housing. A manager was appointed, jointly funded by the town council of Lanark, the county council of Lanarkshire, and the Scottish Development Department, the branch of the Civil

Service responsible for historic buildings. A trust - the New Lanark Conservation and Civic Trust – was formed in 1974 to take over the responsibility for the village. By 1983 the mill area had been compulsorily acquired from Metal Extractions.

The task of reviving and restoring the village was a complex one, for sources of finance were constantly changing as Government policy was modified to suit altered economic and political circumstances. At various times unemployment relief, housing improvement, historic buildings repair, ancient monuments help in kind, economic development and tourism development funds were deployed, from local and central government, and from European Regional Development Funds. Recently money has become available from the Heritage Lottery Fund. In addition to public money, a limited amount of private finance has gone into the village, mainly for house conversion.

As the refurbishment of the village has proceeded, its nature has changed too. Emphasis on its value as a tourist destination has resulted in the creation of visitor attractions within the village, and of a youth hostel and training hotel. A number of commercial users have come to the village, and some have moved on after outgrowing the space available there. Part of the housing has still to be redeveloped, and the School for Children awaits new life as an educational centre. But the village is once again bringing significant economic activity to the area, and is a flagship for a much larger area.

What has New Lanark to offer to the theme of this conference? Firstly it illustrates the importance of a careful choice of location: the advantages of its picturesque riverside site are still significant, and the mill still generates power from the river. Secondly it indicates the value of building well and flexibly. Though for many modern industrial purposes multi-storey buildings have fallen out of favour, the mills at New Lanark have delivered solidly-built, relatively maintenance-free and energy-efficient space for a wide range of purposes. Thirdly it shows how important vision, and the renewal of vision is in the creation and sustaining of appropriate industrial architecture. For Dale and Owen New Lanark was more than just a means for making money, and the Walkers and Birkmyre & Somerville bought into and absorbed that vision. The revival of the village, too, has been the consequence of vision and of far-seeing strategic thinking into which tactical necessity has been fitted. But had it not been for a continuing perception that there was something fundamentally worthwhile about New Lanark, that vision would not have been forthcoming. So for modern industrial building I would argue that careful choice of site, designing for flexibility, low maintenance and energy efficiency, and having a vision which goes beyond immediate economic and technical necessity are all of continuing importance. This is not to say that the short-term view and narrowly specific relationship of building to the task in hand do not have their place, but alongside that there is also a role for the kind of thinking that has created and sustained New Lanark.

J. Hume, juin 1999