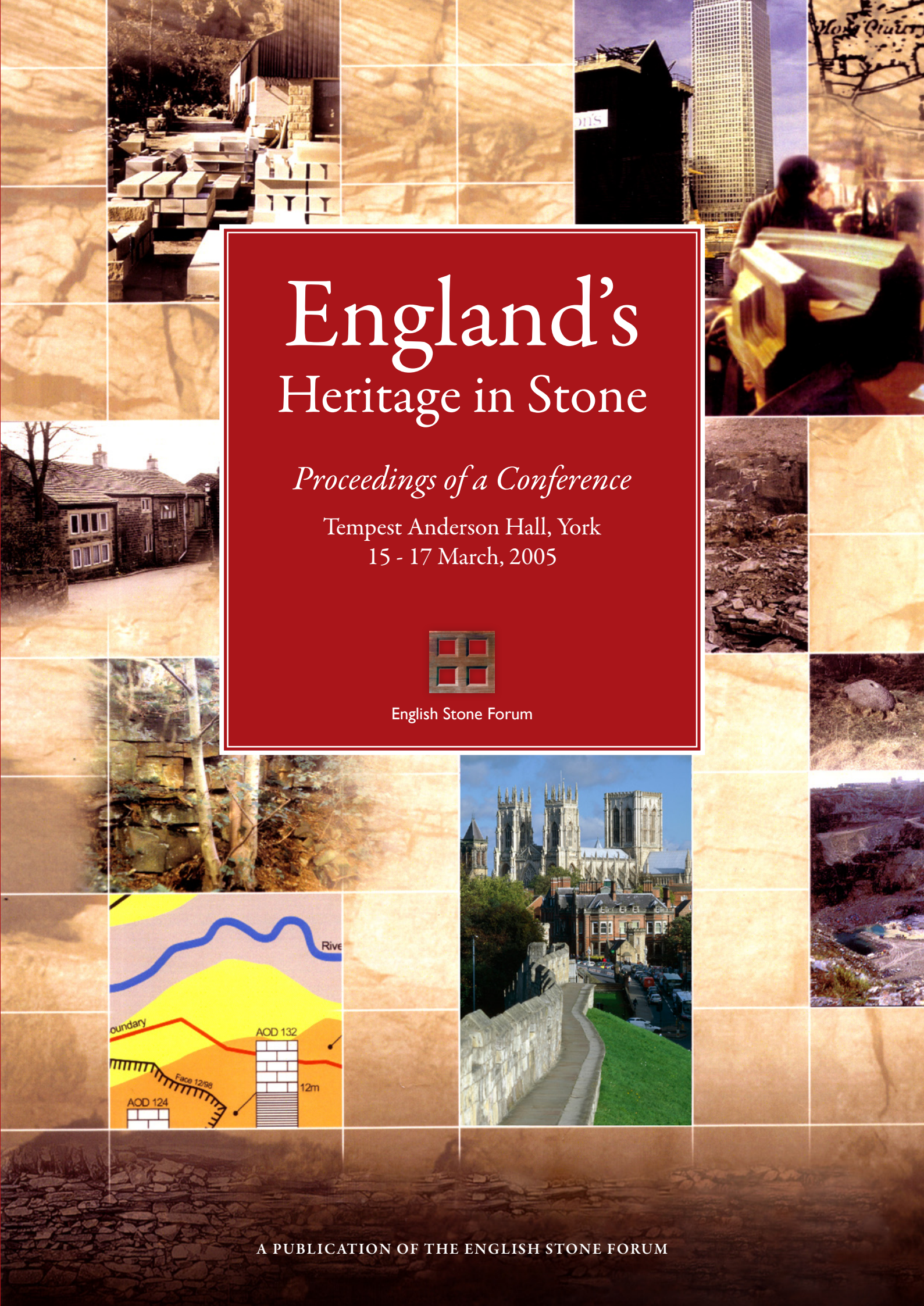

England's Heritage in Stone

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English Stone Forum

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The development of the Victorian stone industry

GRAHAM LOTT

The coronation of Queen Victoria in 1837 saw the start of perhaps the most dynamic and innovative period in Britain's history. It was a period of massive industrial expansion and exploitation at home and abroad. The pace of this development was matched by a rapid growth in population. New towns and cities mushroomed around the main industrial centres. Agricultural and industrial practices went through a period of unprecedented change as the insatiable needs of this growing urban population had to be met. Our natural resources had to be exploited to their fullest extent to house this growing urban workforce. The quarrying of stone for building purposes was no different from any other industry at this time with activity in the quarries reaching a peak by the end of the century.

The Victorian era is seen by some as the end of the use of vernacular building materials in Britain's architecture. While this may be justified in the case of brick with the establishment of the large Oxfordshire and London brick pits and a rapidly improving transport network, it is certainly not true of their buildings in traditional stone areas. Despite great improvements in production and transportation, the use of local stone for building purposes in these areas is still clearly evident well into the early part of the twentieth century. In the Pennine towns local Carboniferous sandstones dominate (e.g., Blackburn, Todmorden, Halifax, or Bakewell), in Oxford the Jurassic limestones of the Windrush valley (Arkell 1947) were still in common use and in Bristol much of the new housing used local Carboniferous limestones and Pennant sandstones with Bath Stone dressings.

The building legacy of the Victorian period is considerable, and much of it is in stone. Hitchcock (1954) suggests that 'Despite the blitz there is still much more building of the Victorian Age left in Britain than there is of any earlier period – perhaps even all the earlier periods together' and this still holds good today. Within this period the architecture of our cities and towns was gradually transformed from one dominated by large classically styled buildings, usually with monochromatic stone fabrics, to a much wider range of innovative building designs using both traditional stone and new materials in a lively polychromatic mix of colours (Dixon & Muthesius 1985).

PRE-VICTORIAN STONE INDUSTRY

Building with stone in England dates back to at least Roman times and it is clear from the evidence of our building heritage that by the end of the eighteenth century most of England's principal building stone sources were already well known and widely quarried. In the eighteenth century local building contracts were largely in the hands of a number of regionally based Master Builders who would design the building, take charge of the construction and probably even use stone from their own quarries to ensure quality and continuity of supply. The Smith family of Warwick dominated building in the Midlands, often using the local Triassic, Bromsgrove Sandstone; the Carr family in West Yorkshire used Carboniferous sandstones and

Figure 1. *St Peter & St Leonard Church, West Horbury (Carboniferous Woolley Edge sandstone – John Carr 1791-3)*

Magnesian limestones, most notably in York, to great effect (Fig. 1).

However, it is also clear that there was still little if any organisation of production and distribution on a national level, and most of the stone produced was principally for use in the local area. The few quarries able to distribute stone nationally, were those fortuitously sited on the coast, or near navigable rivers, a situation that had not changed substantially since medieval times (Fig. 2).

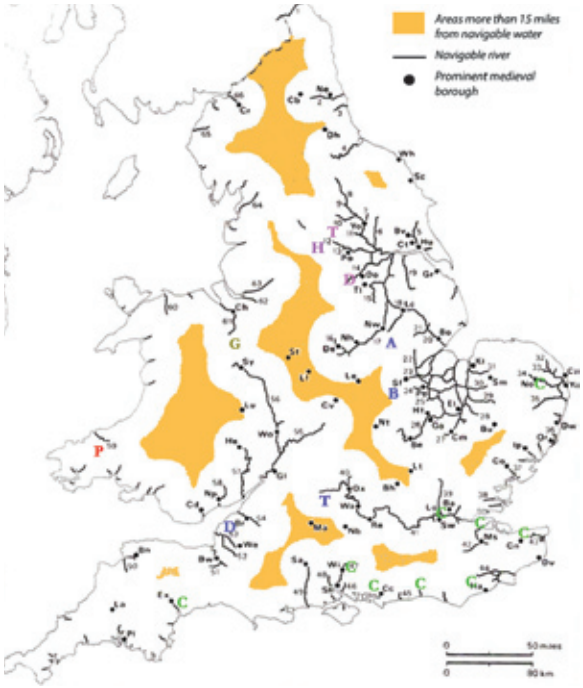

Figure 2. *Medieval navigable river systems, watersheds and principal stone quarrying areas. (T, Tadcaster; H, Huddleston; D, Doncaster; A, Ancaster; B, Barnack; T, Taynton; D, Doulting; G, Grinshill; C, Caen Stone buildings).*

Access to the mainland from one of the principal quarrying areas, the Isle of Portland, for example, could still only be gained by boat at the beginning of the nineteenth century, the first bridge to the mainland was not opened until 1839 (Bettey 1971). The quarries, which had been exporting stone into London from the early seventeenth century, were at that time still concentrated along the eastern and western coasts of the Island. Other examples able to respond to the growing demand for building stone include the granite quarries of Devon, Cornwall and Scotland and the sandstone quarries of Whitby and Craigleith. All were all able to use well-established coastal trade routes to supply stone into London for example in the eighteenth century. Cumbrian slate was well established in the London market place by the middle of the eighteenth century and was also shipped from the quarries via Bristol up the River Severn into Worcestershire and along the Avon to Bath (Tyson 1984, 1998; Munby 1989). The completion of the Avon navigation in 1727 to Bristol, had opened up the possibility of shipping Bath stone anywhere in the UK. The quarry owner and entrepreneur Ralph Allen was quick to see the possibilities and opened several new quarries soon after its construction (Hudson 1971). The numerous Kentish Ragstone quarries, sited along the River Medway, continued to capitalise on their location and dominated the market in London until well into the nineteenth century. Caen Stone from Normandy is generally associated with Norman and Medieval building activity in south-east England but this Middle Jurassic limestone continued to be in high demand for Victorian buildings in the area because of ready access by sea to the quarries.

STONE SOURCES

There are few sources of information describing the extent and distribution of building stone resources in England prior to the beginning of the nineteenth century. The earliest attempts to obtain a national view of building stone quarrying were provided by the general surveys of the agriculture for each British county, commissioned by the then Board of Agriculture. These surveys took place during the late eighteenth and early nineteenth centuries and although variable in their content provided a considerable amount of information on quarrying activity at the time. One of the most comprehensive of these surveys was that for Derbyshire carried out by John Farey and published in 1811. In his survey he provides a comprehensive description of the geology of the county and a listing of all the stone quarries and their products. The survey shows that Derbyshire was already the centre of a considerable local building stone industry that produced Carboniferous sandstones, limestones and Permian Magnesian Limestone for block stone, roofing slates, flagstones and decorative marbles (Farey 1811).

At a national level the publication, in 1815, of the first geological map of the country by William Smith was significant in many ways (Winchester 2002; Torrens 2003). Smith was a self-taught geologist and canal engineer who made his living conducting geological surveys for the fast developing canal construction companies. He used the knowledge gained from these surveys and other sources, such as the work of John Farey, one of his former pupils, to compile the first geological map of the country. The map was of importance because, for the first time, Smith was able to show how the different geological rock formations could be defined and traced across the country. Until then geological understanding of the stratigraphy of the rock succession was rather piece-meal. Smith's map, by showing, for example, that the Jurassic limestone formations of Dorset could be correlated through Gloucestershire, Wiltshire and on into Lincolnshire, enabled the distribution of our natural resources to be better understood; an important factor if you wished to take industrial production into new areas. However, it was still many years before the real advantages of such knowledge was recognised by the Government of the day, and the formation of the Geological Survey of Great Britain (GSGB) with a remit to map in detail the whole of the country's geological resources, had to wait until 1835.

One of the first commissions of the new GSGB was very directly related to the building stone industry. In 1835 the existing buildings of the Houses of Parliament were

destroyed by fire. The government hastily commissioned a competition to design a prestigious new building (Port 1995) After much controversy a design by Charles Barry was accepted and the buildings we see today are the result. One novel aspect of the scheme was that it was also decided to carry out a survey of the UK's principal building stone quarries in order to select a suitable stone for the new buildings. Barry and three other commissioners, William Smith, Henry de la Beche (Director of the new GSGB) and Charles Harriot Smith (sculptor and 'stone expert') were charged with carrying out the survey. Charles Smith, who was largely responsible for proposing the survey, was a major contributor on building stone-related matters to The Builder, at that time, the principal journal of the building industry. In all, 102 quarries were visited by the commissioners, many of which are still in operation today. The four men were required to examine each of the stones and make the final selection. The short-listed stones were subjected to rigorous engineering tests and chemical analysis. Magnesian Limestone was selected, ultimately to come from the Anston Quarries in south Yorkshire (Lott & Richardson 1996). The subsequent report provides the most comprehensive descriptions of the stones and their quarries available up to that time and remained the single most important source of stone information for many years (Barry et al. 1839). One further point of interest is that the stone samples from this survey were deposited in the Economic Minerals Collection of the GSGB and formed the basis of what has become the largest collection of building stones in the country, now numbering more than 13,000 specimens.

By the mid-nineteenth century, however, the Victorian propensity for gathering statistics began to take over. In 1860 Robert Hunt the Keeper of Minerals in the Museum of Practical Geology, part of the GSGB, published the results of the first national government survey of building stone quarries (Hunt 1860). Despite a certain unwillingness by some quarries to complete the survey documents, there were sufficient returns made (3015 quarries from Great Britain and Ireland responded) to provide the first reliable overview of the extent of the industry at that time (Table 1). The report includes a wealth of other information about the quarries, listing ownership, costs and often buildings where the stones had been used. In general, the county-by-county results show that the stone industry was, as might be expected, concentrated in those areas where it is still important today. In England, the Pennine counties dominated sandstone production, and Dorset, Somerset, Gloucestershire and Lincolnshire the Jurassic limestone output. However, the most informative aspect is, of course, the number of operating quarries. In England, 1504 quarries are listed; this compares with 329 active today. We now know that this figure would rise substantially in the latter part of the century, but the Hunt survey remains the only comprehensive dataset for the quarrying industry in the Mid-Victorian period. This is a situation that was not to change until the introduction of the compulsory registration of quarries in the Mines and Quarries Act of 1894.

The Hunt survey preceded the publication of many other informative geological texts including the first specific book

COUNTIES	Building Stone quarries 1858	Brick pits 1858
BEDFORDSHIRE	4	8
BERKSHIRE	2	34
BUCKINGHAMSHIRE	3	24
CAMBRIDGESHIRE		16
CHESHIRE	40	45
CORNWALL	93	15
CUMBERLAND & WESTMORELAND	78	20
DERBYSHIRE	75	56
DEVON	68	40
DORSET	43	59
ESSEX	1	34
GLOUCESTERSHIRE	86	57
HAMPSHIRE	21	76
HEREFORD	49	23
HERTFORDSHIRE		18
HUNTINGDONSHIRE	4	15
ISLE OF MAN	8	
KENT	30	36
LANCASHIRE	122	107
LEICESTERSHIRE	16	10
LINCOLNSHIRE & RUTLAND	41	18
MIDDLESEX	25	25
NORFOLK	4	111
NORTHAMPTONSHIRE	18	23
NORTHUMBERLAND & DURHAM	116	57
NOTTINGHAMSHIRE	10	42
OXFORDSHIRE	12	17
SHROPSHIRE	12	22
SOMERSET	86	33
STAFFORDSHIRE & WORCS.	59	143
SUFFOLK		47
SURREY	28	46
SUSSEX	45	24
WARWICKSHIRE	31	69
WILTSHIRE	44	45
YORKSHIRE	238	93
TOTAL	**1512**	**1508**

Table 1 Hunt's Mineral Statistics (1860) showing distribution of building stone quarries and brick pits that responded to the survey.

On the Building and Ornamental Stones of Great Britain and Foreign Countries written by Edward Hull (1870). Hull, a former staff member of the GSGB and subsequently Director of the Geological Survey of Ireland, had become a specialist in building stone. He published this important early work with the encouragement of Sir Charles Lyell the pre-eminent geologist of the time, who is generally described as the founder of modern geology. Hull's book, which is now rarely cited, provides a very important contribution to our knowledge of Victorian building stones.

It was a landmark publication that few subsequent studies have matched.

INFRASTRUCTURE – CANALS AND RAILWAYS

The single most important factor that allowed this massive growth in stone quarrying through the Victorian period was the development of a new national transport infrastructure. By the end of the eighteenth century industrialisation was well underway. The massive extent of our primary natural resources such as coal and iron was relatively well known, and already under the control of a number of opportunistic industrialists. However, as with stone, these natural resources, with the exception of those ore deposits or coalfields close to the coast, as in Northumberland, or along major navigable rivers, as in Yorkshire on the Aire and Calder rivers, were difficult and expensive to transport further afield. The development, first of canals and then the railways, with their comparatively cheap tariffs rapidly ended this relative industrial isolation and meant that such heavy industries could be established in many other locations. The transformation of stone production from a series of small isolated local quarries was largely a response to the needs of these heavy industries that became the prime markets for their product.

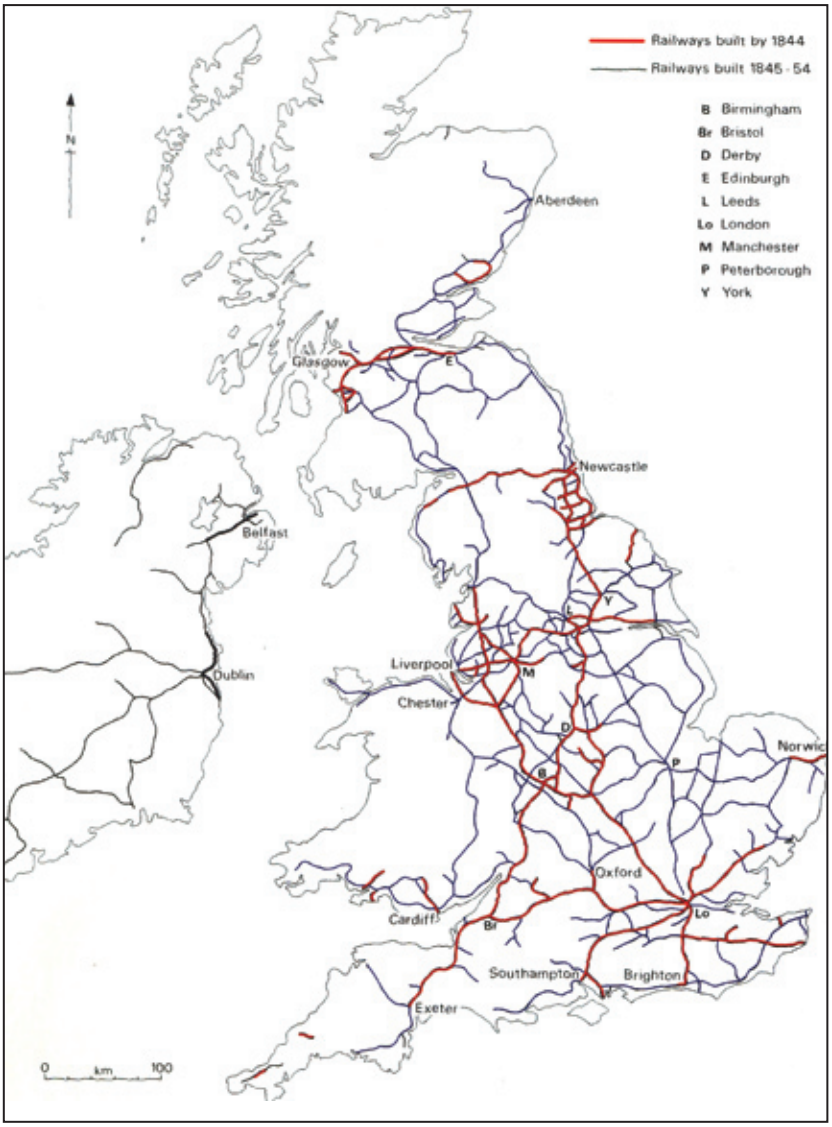

Figure 3. Development of the national rail network

The development of a national canal system proceeded quite rapidly between 1790 and 1830. The effect of canal development on the industry was substantial. The opening, for example of the Kennet and Avon canal in 1810, allowed the Bath Stone quarries access to markets in Oxford and London (Arkell 1947). The Macclesfield Canal, completed between 1824 and 1831, is a late example of many such major civil engineering works. Each section of the canal was contracted out to different construction companies one of whom, Joseph Nowell, opened up a quarry on The Cloud (Carboniferous, Chatsworth Grit) to produce sufficient stone for the locks and major aqueducts. At nearby Bollington the famous Kerridge (Milnrow Sandstone) quarries constructed a tramway link to the canal to send their stone into Manchester.

Despite the gradual growth of the new railways, canals remained influential in transporting stone until at least the late 1830's as the *Report on the Selection of Stone for the New Houses of Parliament* (Barry et al 1839) demonstrates. In the report by far the majority of the quarries described were still reliant on either coastal, river or canal shipment to send their stone to London. The embryonic railway network appears not as yet to have had much of an impact on the stone industry. By the 1840s, however, as the almost frantic development of the national railway network continued, change was inevitable.

The growth of rail transport from a series of small locally run railways, before the 1830's, into a rail network that by 1855 had reached large parts of the country was essential if further industrial progress was to be achieved (Fig. 3). This transport infrastructure transformed the dispersed industries of the eighteenth century into the prosperous commercial enterprises of the nineteenth century. The Bath Stone industry, already a considerable success in its local area, worked hard to expand its markets and was particularly intent on competing in the potentially large London market. In 1841 the opening of the Great Western Railway route from Paddington to Bristol allowed the quarries to provide stone for many prestigious London buildings. To complete some railways routes construction of massive stone viaducts were required like those at Ribblehead (Fig. 4, Carboniferous limestone) or in Durham (Carboniferous, sandstone). By the late nineteenth century architects could use the railways to transport stone over considerable distances. In 1891 the Lancaster-based architectural practice Paley, Austen and

Figure 4. *Ribblehead Viaduct, N. Yorkshire (John Sanders 1869–76); C, Huddersfield Station, W. Yorkshire (J. P. Pritchett 1847–48)*

Figure 5. *Huddersfield Station, W. Yorkshire (J. P. Pritchett 1847–48)*

Figure 6. *Ashmolean Museum, Oxford – Portland and Box Ground stones (C.R. Cockerell 1841–45)*

Paley used Runcorn Stone in the new All Saints Church in Hertford.

The increasing success of the railway companies was proclaimed by the construction of suitably prestigious railway stations and hotels for their more affluent passengers. Many stations are notable stone buildings - Huddersfield 1847-48 (Fig. 5, Carboniferous Rough Rock sandstone); Bristol Temple Meads 1878 (Triassic, conglomerate – Draycott Marble); Worksop 1849 (Permian Steetley Stone, Cadeby Formation); Great Malvern 1862 (local metamorphic rocks with Cotswold Stone dressings); Newcastle Central 1850 (Carboniferous, Prudham Stone).

The building stone industry used the railways to develop and profit from the needs of the other industries. The manufacturing industry needed stone to build factories and houses for the rapidly growing urban workforce. As towns and cities developed the other aspects of urban life were also catered for; new churches, corporate buildings, schools, libraries and museums (Figure 6). Elsewhere, new dockyards and breakwaters and the extraordinary Manchester Ship Canal (1882–94) were constructed, using Penryn granite, Crich limestone and Bramley Fall sandstone, to cope with the growing trade from Britain's colonies. Stone was still very much the favoured building material as the increasingly prosperous cities and towns competed to establish prestigious buildings that reflected their city's industrial success.

STONE QUARRYING

At the end of the eighteenth century quarrying methods remained very much as they had been in medieval times (Ayers 1998; Stanier 2000). The innovative developments in mechanisation and steam driven engines that powered the rest of industry throughout the nineteenth century were slow to penetrate the stone industry. Most stone quarries were relatively small with few employees. They could not afford the considerable investment needed to introduce such mechanisation. Some larger quarries, however, did make such changes. Mechanisation was particularly attractive for the harder stones such as the granites, slates and Carboniferous sandstones where traditional working techniques were slow and difficult. Even so steam power was still, slow to make an impact in the quarries. Steam cranes were introduced in the 1860's and a steam driven drilling rig was used in the Carnsew granite quarries in 1887. Prior to this shot holes were bored using the traditional percussion iron jumper, which needed 112 blows to penetrate 2.5 inches into the granite (Harris, 1888; Stanier 1985). Steam driven cutting machines were in use in some larger limestone quarries from the 1870's. Framesaws date from the same period, but were also only introduced in the larger cutting yards. Hand cutting, dressing and polishing of stones remained the norm for most quarries into the early twentieth century.

The importance of the introduction of railway links and mechanization in the development of a successful Victorian quarrying enterprise is well documented for the Scotgate Ash quarries near Pateley Bridge in Yorkshire (Blacker 1995). Here the owner George Metcalfe, having a very good sandstone resource, identified a large potential market and used all the latest technological developments to turn the site into one of the largest building stone quarries in Yorkshire. The location of the quarries looks initially unpromising as they are located high on the hillside far from the closest railway link at Pateley Bridge. In 1871 Metcalfe built an inclined railway plane, 1 km long, to reach the main railway link below, a system similar to that introduced by Ralph Allen at his Combe Down mines more than a century earlier (Hudson 1971). By the 1890's railway tracks linked all seven of the main working faces and two steam engines

were in use. Steam cranes moved and loaded the stone for the descent to the railway track below. The list of buildings using Scotgate Ash Stone is long, as a consequence of these innovations. It was used in railway stations at York, Scarborough, Darlington and Paddington; in Post Offices at Newcastle, Sunderland and Durham, and in many buildings in Leeds, Harrogate and London. (Blacker 1995). One area of the stone industry that achieved spectacular success in the late nineteenth Century was the flagstone industry centred on Elland in Yorkshire and Haslingden in Lancashire. These thinly bedded sandstones were exported by canal and rail throughout Britain and there are few Victorian towns or cities that were not paved with one or other of Carboniferous sandstones.

Statistical information on numbers employed in the building stone industry on a national basis is not available for much of the Victorian period. There is, however, some general information about employment levels for some quarries. At Portland in 1839 the 56 quarries operating employed 240 people; at the Weston red sandstone quarries in Runcorn in 1850 upwards of 150 men were employed (Tresise 1994). During the period 1841-1891, at the Grinshill-Clive quarries, the total number of employees according to census returns, including both stonemasons and quarrymen, ranged from 23 in 1841, rising to 62 in 1861 and falling to 60 in 1891 (Thompson 2004).

In the first edition of the trade magazine The Builder, published in 1843, returns from the 1831 census show that after Carpenters (103,238), Masons or Wallers (49,159) form the principal employment of professional workers (Table 2). In 1873 a report on the Bradford building trades states that '6000 men were engaged in stone-getting and dressing' in the local quarries. By the end of the century, however, the gathering of statistics was firmly established and employment figures on a quarry-by-quarry basis are available from 1896 onwards, principally as a consequence of the introduction of the Mines and Quarrying Act of 1894. A typical moderate sized quarrying business run by the Ham Hill and Doulting Stone Company in Somerset, in 1898 employed 60 masons dressing their limestones, with 20–30 labourers. The company had five moulding machines and two vertical saw frames with toothed blades. The stone was moved around the yard using two travelling cranes of 10 and 6 ton capacity. The machinery was driven by a single 20 h.p., high pressure, steam engine. All the quarrying equipment was manufactured by Isles and Co. of Leeds, one of several engineering companies supplying such equipment (Anon 1899).

STONE MERCHANTS – MARKETING THE STONE

With few exceptions, the many stone quarry owners operating at the end of the eighteenth century were still likely to be principally concerned with the marketing and sale of their stones locally. The typical quarry owner would probably have little choice in the matter as such bulky material could not be transported far on the inadequate roads. Most quarries were still small and owned by individual families – the Gregory and Lindley families of Mansfield and Ancaster; the Medwells of Clipsham, Rutland; the Corbett's

CENSUS RETURNS 1831 THE BUILDER 1843 VOL. 1 DEC 31P.16	
TRADE	NUMBERS
ARCHITECTS & ENGINEERS	NONE GIVEN
AGENTS	NONE GIVEN
AUCTIONEERS	2823
BRICKLAYERS	29653
BRICKMAKERS	10184
BUILDERS	5204
CARPENTERS	103238
CABINET MAKERS	21774
CARVERS & GILDERS	2854
CHAIR MAKERS	802
IRONMONGERS & IRON FOUNDERS	10411
LAND JOBBERS	651
LIME BURNERS	3122
MASONS OR WALLERS	49159
MARBLE CUTTERS	1732
NAILORS	1882
PAINTERS	15653
PLUMBERS & GLAZIERS	11999
PLASTERERS	9683
SAWYERS	19181
SLATERS	4539
TURNERS	5905
UPHOLSTERERS	2932
UNDERTAKERS	1121
TOTAL	**314502**

Table 2. *Census returns 1831 showing principal professional trades employment – (source The Builder 1843, Vol. 1, 31 December, p.16)*

of Grinshill, Shropshire to name only a few. Their stones would be advertised largely by word of mouth or in one of the many local county directories Pigot's, White's, Kelly's, Wright's, etc.

With the development of the rail network the more dynamic quarry owners soon recognised the potential of marketing their stone on a national scale. Perhaps the subsequent speed of change in the industry is best displayed in the first great showcase for British industry in the Great Exhibition at the Crystal Palace in 1851. The Mining and Mineral Products section included a substantial number of displays (62 in all) by stone producers and merchants from across the country (Table 3). It is clear from the list of exhibitors that many of the stones from our principal quarrying areas were well represented, including Cornish granite; Carboniferous sandstones from the Pennines; magnesian limestone from Yorkshire and Nottinghamshire; Jurassic limestone from Dorset, Somerset, Gloucestershire, Wiltshire and Lincolnshire and, from further afield Welsh and Devon slates and the granites of Scotland. The London stone merchants Freeman, William & John exhibited twelve granites, seven limestones and eight sandstones. In this new railway age the Bath Stone industry led the way in promoting its stone throughout the country. The company of Randall and Sanders based at Corsham pub-

CAT. DISPLAY NUMBER	OWNER / COMPANY	QUARRY		LOCATION	STAND	PRODUCER	TRADE NAME	STONE TYPE	SOURCE
OUTSIDE THE BUILDING									
6	Morphet, Jonathan	Horton Wood Quarries	slate, metamorphic	Settle		Freeman, William & John	Polyphant	serpentinite	Cornwall
7	Greaves, R		Blue Lias	Warwick		Freeman, William & John	Purbeck	Limestone, Upper Jurassic	Dorset
8	Carter, J	Old Delabole	slate, metamorphic	Cornwall		Freeman, William & John	Portland	Limestone, Upper Jurassic	Dorset
12	Barwis, W. H. B.	Welsh Slate Co.	slate, metamorphic	Ffestiniog		Freeman, William & John	Farleigh Down	Limestone, Middle Jurassic	Somerset
13	Sinclair, J.	Forse Quarry	sandstone, Devonian	Thurso		Freeman, William & John	Box	Limestone, Middle Jurassic	Somerset
18	Sharp, Samuel	Rockhill Quarry	sandstone, Devonian	Wick		Freeman, William & John	Combe Down	Limestone, Middle Jurassic	Somerset
20	Carnegie, W.F.L.	Leysmill Quarry	Sandstone, Carboniferous	Arbroath		Freeman, William & John	Kentish Rag	Limestone, Lower Cretaceous	Kent
22	Haywood, Jonas	Ardsley Oaks Quarry	Sandstone, Carboniferous	Barnsley		Freeman, William & John	Huddlestone	Magnesian Limestone, Permian	Yorkshire
23	Dove, Dugald	Nitshill Quarry	Sandstone, Carboniferous	Glasgow		Freeman, William & John	Darley dale	Sandstone, Carboniferous	Derbyshire
24	Bedford, Bonson, Drake & Co.	Oaks Quarry	Sandstone, Carboniferous	Barnsley		Freeman, William & John	Cromwell Bottom	Sandstone, Carboniferous	Yorkshire
25	Raynes, Lupton & Co.	Pentegwyddel Quarry;	limestone, Carboniferous	Abergele		Freeman, William & John	Heaton	Sandstone, Carboniferous	Yorkshire
	Raynes, Lupton & Co.	Graig Llwyd	Igneous	Penmaenmawr		Freeman, William & John	Potternewton	Sandstone, Carboniferous	Yorkshire
27	Towler, Edward	Kirton Lindsey	Blue Lias Limestone	Lincolnshire		Freeman, William & John	Gipton Wood	Sandstone, Carboniferous	Yorkshire
54	Cheesewring Granite Co.	Cheesewring	Granite	Cornwall		Freeman, William & John	Bramley Fall (Meanwood)	Sandstone, Carboniferous	Yorkshire
75	Hosken, Richard	Penryn	Granite	Cornwall		Freeman, William & John	Horseforth	Sandstone, Carboniferous	Yorkshire
						Freeman, William & John	Gazeby (Gaisby)	Sandstone, Carboniferous	Yorkshire
INSIDE THE BUILDING					164	Hicks, Thomas	Truro	porphyry, assorted	Cornwall
7	Breadalbane, Marquis of	Glenorchy	Granite and porphyry		171	Sowden, mathew	Burley-in-Wharfedale	Sandstone, Carboniferous	Yorkshire
	Breadalbane, Marquis of	Barrs and inverliver Quarries	Granite and porphyry	Loch Etive	172	Freeman, Samuel	Pearson Brow	Sandstone, Carboniferous	Yorkshire
45	Mitchell, W.B.	Bull Hill Q.	Sandstone, Carboniferous	Sheffield		Freeman, Samuel	Hipperholme	Sandstone, Carboniferous	Yorkshire
	Mitchell, W.B.	Reeves Edge Q.	Sandstone, Carboniferous	Sheffield		Freeman, Samuel	Northowram	Sandstone, Carboniferous	Yorkshire
	Mitchell, W.B.	Green Moor Q	Sandstone, Carboniferous	Sheffield		Freeman, Samuel	Southowram	Sandstone, Carboniferous	Yorkshire
	Mitchell, W.B.	Brincliffe Edge Q	Sandstone, Carboniferous	Sheffield		Freeman, Samuel	Cromwell Bottom	Sandstone, Carboniferous	Yorkshire
	Mitchell, W.B.	Grenoside Q.	Sandstone, Carboniferous	Sheffield		Freeman, Samuel	Blackstone	Sandstone, Carboniferous	Yorkshire
	Mitchell, W.B.	Wickersley Q.	Sandstone, Carboniferous	Sheffield		Freeman, Samuel	Elland Edge	Sandstone, Carboniferous	Yorkshire
	Mitchell, W.B.	Steetley Q.	Magnesian Limestone	Sheffield		Freeman, Samuel	Greetland	Sandstone, Carboniferous	Yorkshire
51	Ross, Thomas	Tilgate Stone, east Cliff	Sandstone, Cretaceous	Hastings	174	Haigh, John	Northowram	Sandstone, Carboniferous	Yorkshire
54	Brodie, Peter	Purbeck	Limestone	Vale of Wardour	175	Johnstone,George	Carlingnose	Sandstone, Carboniferous	Edinburgh
	Brodie, Peter	Robinswood hill	Ironstone / limestone	Gloucester		Johnstone,George	Barnton Mouth	Sandstone, Carboniferous	Edinburgh
	Brodie, Peter	Hewlett's hill	Ironstone / limestone	Cheltenham		Johnstone,George	Craigleith	Sandstone, Carboniferous	Edinburgh
	Brodie, Peter	Chipping Camdon	Ironstone / limestone	Chipping Camden	176	Luard, Beedham & Co.	Caen	Limestone, Middle Jurassic	France
	Brodie, Peter	Bidford 'marble'	Limestone	Warwickshire	179	Kirk & Parry	Wilsford	Limestone, Middle Jurassic	Lincolnshire
132	Gowans, James	Redhall Quarry	Sandstone, Carboniferous	Edinburgh	180	Foot, John	Portland	Limestone, Upper Jurassic	Westminster
	Gowans, James	Binnie Quarry	Sandstone, Carboniferous		181	Staple, Thomas	Ham Hill	Limestone, Lower Jurassic	Dorset
133	Freston, William	Painswick Q.	Limestone. Middle Jurassic	Gloucestershire	182	Rutherford, Jesse	Wingerworth	Sandstone, Carboniferous	Wingerworth
134	Maxwell, Wellwood	Craignair Q.	Granite	Dalbeattie		Rutherford, Jesse	Lion	Sandstone, Carboniferous	Wingerworth
135	Voss, James	Corfe Castle	Purbeck Marble	Dorset		Rutherford, Jesse	Bramley Fall (Winger-worth)	Sandstone, Carboniferous	Wingerworth
136	King, Thomas	Hartford Bridge	Sandstone, Carboniferous	Morpeth	183	Walsh, John	Potternewton	Sandstone, Carboniferous	Leeds
137	Sim, William	Inverary Q.	granite	Inverary	184	Price, J.	Gateshead	Sandstone, Carboniferous	Gateshead
	Sim, William	Bonaw Q.	granite	Bonaw	185	Grissell, Thomas	Anston	Magnesian Limestone, Permian	Westminster
	Sim, William	Loch Etive Q	granite	Loch Etive	186	Lindley, Charles	Mansfield (red & white)	Magnesian Limestone, Permian	Mansfield
	Sim, William	Mull Q	granite	Ross of Mull	188	Stocks, michael	Shebden Head	Sandstone, Carboniferous	Yorkshire
141	Meredith, James Henry	Withiel	porphyry, assorted	Fowey	189	Bell, John	Clee Hill Marble	Limestone, Middle Jurassic	London
146	Hall, Joseph	Ashford Marble	limestone	Derbyshire	190	Clark, George Houston	Haytor	granite	Rotherhithe
	Hall, Joseph	Chellaston	Alabaster	Derbyshire		Clark, George Houston	Bramley Fall (Fair Head)	Sandstone, Carboniferous	Rotherhithe
149	Damon, T.	Weymouth	Septaria (Turtle Stone)	Dorset		Clark, George Houston	Marshall Meadows (Berwick)	Sandstone, Carboniferous	Rotherhithe
151	Quilliam & Creer	Castletown	Poolvash Marble	Isle of man	191	Williams, William	Quarella	Sandstone	Bridgend
153a	Trenchard, John	Rodwell Q.	limestone	Weymouth	194	Jennings, Benjamin	Three elms	Sandstone, Devonian	Hereford
154	Sparks, W.	Blackdown	chert honestones	Dorset	195	Cumming, Rev. Joseph George	Poolvaish Marble	Limestone,Carboniferous	Isle of Man
	Sparks, W.	Langton Herring	Purbeck Marble	Dorset		Cumming, Rev. Joseph George	Port St. Mary Marble	Limestone,Carboniferous	Isle of Man
	Sparks, W.	Bothenhampton Q.	Stone slate	Dorset		Cumming, Rev. Joseph George	Peel Freestone	Sandstone, Devonian	Isle of Man
	Sparks, W.	Ham Hill Q.	ferruginous limestone	Dorset		Cumming, Rev. Joseph George	South Barrule	Granite	Isle of Man
	Sparks, W.	Lyme Regis	Blue Lias	Dorset	197	Powell, Frederick	Knaresborough	Magnesian Limestone, Permian	Yorkshire
	Sparks, W.	Curry Rivell	Blue Lias	Dorset	198	Carnegie, W.F.	Leysmill	Sandstone, Devonian	Arbroath
	Sparks, W.	Keinton	Blue Lias	Somerset		Carnegie, W.F.	Border	Sandstone, Devonian	Arbroath
	Sparks, W.	Beer Crowcombe	White Lias	Somerset		Carnegie, W.F.	Carmyllie	Sandstone, Devonian	Arbroath
	Sparks, W.	Twerton	White Lias	Somerset		Carnegie, W.F.	Balgavie	Sandstone, Devonian	Arbroath
	Sparks, W.	Bishop's Lydiard	Sandstone, Permian	Somerset		Carnegie, W.F.	Balmashanner	Sandstone, Devonian	Arbroath
	Sparks, W.	Hanham Q.	Pennant sandstone	Somerset		Carnegie, W.F.	Lochee	Sandstone, Devonian	Arbroath
	Sparks, W.	Breakwater Q.	Limestone, Carboniferous	Devon		Carnegie, W.F.	Gaynd	Sandstone, Devonian	Arbroath
	Sparks, W.	Newton Abbot	Limestone, Devonian	Devon	201	Taylor, John	Stamford	Limestone, Middle Jurassic	Lincolnshire
	Sparks, W.	Kingkerswell	Limestone, Devonian	Devon	202	Powell, W.J.	Chicksgrove	Limestone, Upper Jurassic	Wiltshire
160	Freeman, William & John	Lamorna	granite	Cornwall	203	Driver, William	Chevin	Sandstone, Carboniferous	Yorkshire
	Freeman, William & John	Constantine	granite	Cornwall	204	Stanhope Quarries	Stanhope	Limestone, polished, Carboniferous	Durham
	Freeman, William & John	Carnsew	granite	Cornwall	206	Sinclair, J	Forse	Sandstone, Devonian	Caithness
	Freeman, William & John	Polkango	granite	Cornwall	209	Stirling, Thomas	Delabole	slate, metamorphic	London
	Freeman, William & John	Zennor	granite	Cornwall		Stirling, Thomas	Llanberis	slate, metamorphic	London
	Freeman, William & John	Rosemorran	granite	Cornwall		Stirling, Thomas	Ffestiniog	slate, metamorphic	London
	Freeman, William & John	Foggintor	granite	Devon		Stirling, Thomas	Penrhyn	slate, metamorphic	London
	Freeman, William & John	Aberdeen	granite	Scotland		Stirling, Thomas	Dorothea	slate, metamorphic	London
	Freeman, William & John	Peterhead	granite	Scotland		Stirling, Thomas	Machynlleth	slate, metamorphic	London
	Freeman, William & John	Stirling Hill	granite	Scotland		Stirling, Thomas	Ulverstone	slate, metamorphic	London
	Freeman, William & John	Dalkey	granite	Ireland	210	Greaves, John W.	Ffestiniog	slate, metamorphic	Caernarvon
	Freeman, William & John	Dun Laoghaire	granite	Ireland	211	Breadalbane, Marquis of	Easdale	slate, metamorphic	Perth
					214	Carter, Jas.	Old Delabole	slate, metamorphic	Devon

Table 3 *Stone companies advertising UK stone products at the Great Exhibition, The Crystal Palace 1851. (Source – Official Descriptive and Illustrative Catalogue, Mining and mineral Products).*

Figure 7. *Rugby School, Warwickshire (W. Butterfield 1867 and later)*

lished, in 1856, a comprehensive lists showing the price of their Corsham, Box Ground, Corngrit and Combe Down limestones delivered by rail to any part of England or Wales (Hudson 1971, Appendix 2). They certainly appear to have reaped the benefits as Bath stones were commonly selected as dressings for many Victorian 'villas' and other buildings in towns far away from the mining area, for example in Oxford or at William Butterfield's Rugby School where Box Ground Stone was also used (Fig. 7).

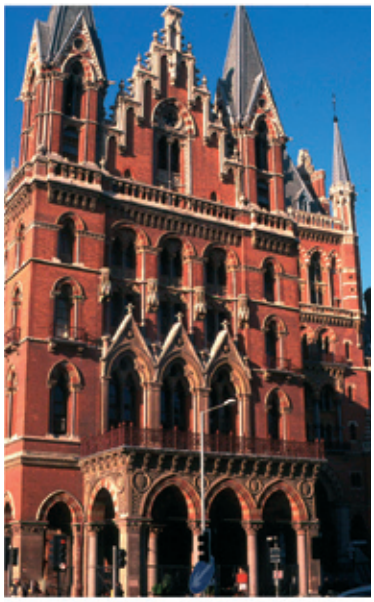

Figure 8. *Grand Hotel, St Pancras, London (George Gilbert Scott 1868–74*

There was one other way to promote your stone products and that was to showcase them in a suitably prestigious building. One of the best examples is the Midland Grand Hotel at St Pancras Station. Designed for the Midland Railway Company by George Gilbert Scott (1868–74) it was constructed principally using building materials from the catchment area of the railway route – Shap granite columns (Cumbria), Nottinghamshire red 'Gripper' brick fabric, Ancaster, Ketton (Lincolnshire) and Red Mansfield stone (Nottinghamshire) dressings and Swithland slate roofs (Leicestershire). There are few Victorian buildings that display their varied building materials to better effect (Biddle 2003; Fig. 8).

THE CUSTOMERS

In order to produce a successful stone industry it was, of course, important to have sufficient customers for the stone. Although this period saw a decline in aristocratic patronage of the building industry, it also created a host of new clients for stone. The industry began to be patronised by newly established town corporations and a new 'aristocracy' of wealthy industrialists. These newcomers regularly employed the new professional architectural practices that were eventually to establish much of the Victorian character of our cities and towns, commonly using stone to great effect. Most of our northern industrial cities and towns went through a period of extraordinary expansion at this time. Many such towns (eventually cities) in the Yorkshire area were first established on the back of the textile industry – principally Leeds, Bradford, Dewsbury, Keighley, Huddersfield and Halifax but with smaller developments at Barnsley, Brighouse, Bingley and Cleckheaton (Fig. 9). Each town specialized in a different part of the textile trade, Dewsbury for example, built largely of local Coal Measures sandstones, was essentially concerned only with the production of woollen blankets made from rags imported from across Europe (Giles & Goodhall 1992). As a result

Figure 9. *Cleckheaton Mill*

the Carboniferous sandstone quarries of Yorkshire and Lancashire in particular dominated the stone industry in terms of numbers of quarries and volume of output.

Much of the sandstone produced in the Pennine area was for use in ordinary domestic houses. The characteristic stone terraces of Bradford (Elland Flag sandstone) or Darwen (Rough Rock sandstone), for example, were built by a new group of speculative builders who were able to co-ordinate work carried out by the different trades to produce the high volumes of basic houses that were badly needed. The individual was no longer responsible for building his own house, but relied on landowners, local authorities or the speculators to provide a home at an affordable rent. In contrast, some benevolent industrialists, such as Titus Salt, who made a fortune from his alpaca woollen mills in Bradford, were equally concerned with the welfare of their workforce. Salt constructed, between 1851 and 1876, a complete town – Saltaire - for his workers comprising 750 houses along with churches, schools and a new mill (Fig. 10). Designed by the prominent Bradford architectural practice of Lockwood & Mawson, the buildings were all constructed from Carboniferous Rough Rock sandstone quarries on site.

There are many other examples of similar, if less grand, philanthropic housing schemes – the Metcalfe family at Glasshouses (flax spinning), the Brook family at Meltham

Figure 10. *Saltaire housing (Lockwood & Mawson 1851–56)*

Mills (cotton), the Crossleys of Halifax (carpet weaving). The Akroyds (worsted) employed George Gilbert Scott to design Akroyden (1859). All these new communities were housed in locally quarried Carboniferous sandstone buildings. In Derbyshire, around Duffield, the local mill owners used Ashover Grit extensively in their industrial buildings and workers houses. The mill owners and industrialists themselves also built their own homes, often on a grand scale – Samuel Lister, owner of the gigantic Manningham Silk Mill (Elland Flags) in Bradford also built Lister Hall; Edward Akroyd built Bankfield, John Field built Dobroyds Castle from the local Todmorden Grit (Giles & Goodhall 1992). At Nottingham in 1875 the hosiery manufacturer T.B. Cutts commissioned Malvern House (Fig. 11, Bulwell, Red Mansfield and Ancaster stone). Near Grantham Joseph Hornsby, the successful agricultural engineer, built his gothic Victorian home (1859-1872) from rock-faced

Figure 11. *Malvern House, Nottingham (T. Sulley 1874)*

Ancaster Stone.

Away from the industrial centres, however, there was a smaller but equally important market for stone. Bankers and many of the new Members of Parliament built homes that reflected their wealth and newfound status (Girouard 1979). Perhaps one of the grandest houses built in the period was Mentmore (1855) for the Rothschild banking family. The house, one of the few projects, apart from the Crystal Palace, designed and undertaken by Joseph Paxton (and George Stokes) was built of Ancaster Stone. This was the same stone used by Smythson at Wollaton Hall (1558) in Nottingham, the house on which Paxton based his design for Mentmore.

In most cases money was no object and lavishness was to be encouraged. Tyntesfield House (1863) built by the Gibbs family from the proceeds of the phosphates trade was constructed using Bath oolitic limestone. Lord Armstrong, whose fortune was accrued from his engineering designs and armaments factories, commissioned Cragside (1870–75) in Northumberland. Designed by Norman Shaw it was constructed of local Carboniferous sandstone from the Fell Sandstone Formation on the estate.

However, there was still some money to be had from the aristocracy who also appear to have been caught up in the house-building boom. In Lincolnshire, Anthony Salvin (and subsequently William Burn) designed the extravagant Harlaxton Hall for the reclusive Gregory Gregory. The house, which is built entirely of the local Middle Jurassic, Ancaster Stone, was begun in 1837 and construction continued for the next 14 years. The castellated Eastnor Castle (1812) designed by Robert Smirke for the Somers family was constructed of finely ashlared stone from the Carboniferous Pennant sandstone quarries of the Forest of Dean.

CHURCH BUILDING IN THE NINETEENTH CENTURY

The rapid population growth in England during the late eighteenth century had raised a number of concerns amongst the clergy, not only about the moral and spiritual well being of the population, but also about the increasing number of dissenters leaving the fold. The concentration of large numbers of people in new urban centres without a suitable place of worship was seen as a large part of the problem. Consequently, with the encouragement of the Church of England, in 1818 the government set up the Church Building Commission, which over a period of 38 years, provided grants totalling £1.7 million to be used to build new churches in the most deficient urban centres (Port 1961). In all 612 churches were built across England and Wales many of which were constructed entirely of stone from local quarries. At Belper in Derbyshire, St Peter's was built of local Ashover Grit. In London, the ubiquitous Portland Stone was used for many commissioner's churches, as at All Soul's, Langham Street. This work programme involved many well known architects. Initially the work was subject to review by the Crown Architects, Smirke, Soane and Nash, who tried to set cost limits for construction and themselves designed a few of the churches at the outset. However, the building programme was probably of greatest benefit to the members of the newly established Institute of British Architects as it involved dozens of provincial architectural practices. Some architects were more prolific and innovative than others. The Rickman practice in Birmingham completed 21 churches, at one point constructing four simultaneously. Rickman experimented with the use of cast iron in window tracery, roof piers and roofing to try to keep costs down. However, stone was still generally the principal building material wherever possible (Fig. 12).

Church building did not end when the Commission

Figure 12. *St Peter, Hampton Lucy, Warwickshire (T. Rickman & Hutchison 1822-6)*

completed its task and further work, largely sponsored by private funds, resulted during the period 1840–76, in all a total of 1727 new churches being built and 7144 existing churches being restored (Clarke 1939). In Shropshire for example 84 new churches were constructed between 1830 and 1869. The restoration of churches proved to be a lucrative area of work for both the architects and the stone industry. There are very few of our churches that escaped the attentions of these Victorian restorations. The best known of them is probably George Gilbert Scott who was perhaps responsible for the 'revising' of more of our medieval churches than most across the country. His often criticized efforts in this field were largely responsible for the eventual creation of the Society for the Protection of Ancient Buildings by William Morris and others in 1877, established to prevent such misuse occurring again. However, Scott was not alone in his work, in the East Midlands, for example, the Hine practice in Nottingham 'restored' more than 21 local churches. Church building was not of course restricted to the Church of England and many Roman Catholic churches were also constructed at this time, e.g., St Edward, Clifford (Magnesian Limestone, Permian). Pugin constructed several gothic churches and also the RC cathedral at Nottingham, the latter using Derbyshire Stancliffe Darley Dale sandstone.

CORPORATE BUILDINGS

Town halls, largely a product of new municipal legislation in particular demanded an increasing amount of stone (Cunningham 1981). Generally the most prestigious civic building to be erected, they were almost invariably built of, or dressed with, stone. Some of the larger buildings are well documented; Birmingham 1831 (Carboniferous Limestone - Anglesey 'Marble'); Shrewsbury 1840 (Grinshill sandstone); Liverpool St George's Hall 1841-56 (Carboniferous sandstone, Stancliffe Darley Dale), Leeds Town 1853-58 (various local Carboniferous sandstones); Manchester 1868-77 (Carboniferous sandstone – Spinkwell Stone); Colchester 1897 (Portland and brick). There were hundreds of smaller town halls built throughout the country many of which used stone to greater or lesser extent depending on their location in relation to the principal stone quarrying areas, e.g. Chipping Norton (Middle Jurassic limestone)(Fig. 13).

To develop and sustain such a large number of new towns and cities required a plethora of essential services. New schools were particularly important, as were hospitals, almshouses, social centres, shops, museums, prisons etc. Perhaps of greater importance than some of the other services was the provision of a suitable drinking water supply. The industrial conurbations of the Pennine area were particularly well served by the construction of numerous reservoirs high in the Pennine hills. Invariably many of these structures were stone built or at the very least stone faced. An expanding city like Bradford needed to construct dozens of such reservoirs. Most were built by opening up small quarries in the Carboniferous sandstones near the reservoir site and although few developed into quarries of national importance they were major local employers for some considerable time and construction work continued into the early part of the twentieth century. (Bowtell 1979). On a much larger scale the Vyrnwy Dam (1881-1892) supplying water to Liverpool, the Elan dams (1893 to 1904 Ordovician Caban Coch conglomerate and Carboniferous Pennant

Figure 13. *Chipping Norton Town Hall, Oxfordshire (G.S. Repton 1842)*

Sandstone) supplying Birmingham, and the Thirlmere Dam (1890-94; Carboniferous Longridge Sandstone) supplying Manchester were all constructed of locally quarried stones.

THE ARCHITECTS AND STONE

The well-documented industrial successes and excesses of the Victorian period are reflected in the equally innovative designs of the buildings of the period. Perhaps one of the most notable changes to affect the building industry in the nineteenth century was the formal establishment in 1837 of the profession of architect and its supporting organisation the Institute of British Architects. The Institute was established not only to set and maintain professional standards but also to provide training for, and support to, a new generation of architects wanting to join the profession. In the pre-Victorian period most 'architects' usually obtained their work largely through patronage from the aristocracy or through the influence of church or crown. The large architectural practices common today, undertaking a multitude of different projects, did not really exist, they were ultimately a product of this same intense phase of Victorian industrial expansion.

The period is characterised by many of the great names

in British architecture, Barry, Pugin, Scott, Butterfield, Burgess, Godwin and Waterhouse to name only some of those with a national portfolio of buildings. Their work and careers are generally well documented through their buildings and biographies (e.g., Cunningham & Waterhouse 1992), but only in rare instances do we find any reference or discussion as to the method of selection of their building materials, which, in many of their major buildings was stone. The exception to this general point is of course Charles Barry who clearly supported the need to make an assessment of the available building stones for his greatest work, the New Houses of Parliament (Barry et al. 1839). There appears not to have been any similar effort made for any subsequent major buildings. We do not, for example, know whether the Carboniferous Stancliffe Darley Dale sandstone used by Elmes in St George's Hall, Liverpool was the only candidate for selection or on what grounds the choice was made. At Birmingham the choice, by Hansom & Welch, of Carboniferous Anglesey 'Marble' for the new Town Hall (1832–34) is also intriguing. In general the selection of stone seems to be made on grounds of simple expediency or economics and local stones were generally used where possible as in the Town Halls of Dewsbury, Bradford and Leeds each of local Carboniferous sandstones (Dimes & Mitchell 1996).

Figure 14. *Mount St Bernard Abbey, Leicestershire (A.W. Pugin 1843*

It is clear, however, that some architects were very concerned about the choice of materials for their buildings and the stone selected became very much a part of the design. Augustus Pugin, for example, in Mount St Bernard's Abbey was clearly aware of the difficult nature of the local metamorphic slates and igneous rocks of the Charnwoood Forest. He produced a design that displays these hard, angular intractable stones to obvious effect (Fig. 14).

Paralleling the great national figures were a plethora of local architects and practices many using equally innovative designs that have come to characterise some of our smaller towns and cities. In Nottingham, for example, there were two such practices that have left an indelible mark on the Victorian architecture of the city, T.C. Hine (1813–99) and Watson-Fothergill (1841–1928). The practice of Thomas Hine was responsible for many new buildings in the city between 1850 and 1880. One of his best surviving pieces of work is perhaps the Adam's Building in Nottingham's Lace Market where he used Ancaster Stone. Hine also

Figure 15. *Watson Fothergill Office, Nottingham (Watson Fothergill 1895)*

used Nottingham's local Bulwell Stone (Magnesian Limestone) in many of his early buildings. Watson-Fothergill's architectural contribution to the city is more colourful. He was a follower of Pugin and Street, carved busts of whom decorate his original office in the city. His gothic stone buildings, with their towers, turrets and oriel windows, commonly use a polychromatic mix of local Derbyshire Carboniferous sandstones, Red Mansfield Stone, Scottish red granites and white Portland Stone to aesthetic effect (Fig.15).

The success of the establishment of the architectural profession at this time cannot be underestimated as the style, ingenuity and sheer colourful flourish of the buildings they produced has never been matched before or since (Fig. 16). The pace of industrial progress was gathering speed and the need for innovative designs for an unprecedented number of new buildings, e.g. railway stations, town halls, mills, factories and docksides, not to mention the requirement

Figure 16. *Ettington Park, Warwickshire – Lias limestone, Hornton and Cotswold stones (John Pritchard & J.P. Seddon 1858–62)*

for high density housing for the rapidly growing urban workforce. This ensured there was no shortage of recruits to the profession. While the new breed of architect could also take advantage of a variety of novel materials being produced by the industrial processes, most notably perhaps the use of iron and steel frameworks, for most prestigious buildings, however, stone was still essential.

THE LEGACY

Along with the benefits of Victorianism there also came the disadvantages. One problem that remains with us today was industrial pollution. By the latter part of the nineteenth century the attractive honey-coloured Yorkshire stone for instance had become a soot-blackened abomination. The lively experiments with colour were soon to be almost lost beneath the industrial grime that developed in almost all our large towns and cities where power and heating was largely supplied by coal and lighting by gas. The inventive Victorians were, however, not in the least daunted. Architects began to use glazed tiles (terracotta and faience) to combat the problem. In London, Leeds and many other towns and cities the colourful glazed tiles and blocks of the Burmantofts factory were widely used. Other factories, such as Doulton and Ruabon produced similar products.
A less obvious legacy, however, is that provided by the thousands of disused and infilled quarry sites from the period. Many quarries proved useful as waste disposal sites around industrial areas, and often we have little idea of the nature of the fill that they contain. Other quarries have now long been part of the natural landscape and it is often difficult to associate them with their former industrial usage, e.g., Grinshill (Thompson 1995). In some areas, as around Bradford, the former waste tips of the Elland Flagstone industry, which reached its peak between 1850 and 1946, now provide the spectacular drystone Judd walls built to retain the stone waste. These protected walls now represent part of our industrial heritage. The designation of other quarry sites for nature conservation has meant that already many are no longer accessible as potential sources of stone for conservation work.

The death of Queen Victoria in 1901 saw the beginning of the end of a golden age in which Britain's building industry transformed our cities and towns into the diverse urban centres we have today. However, the principal downturn in the fortunes of the stone industry came with the beginning of the 1914–18 World War when for obvious reasons the skilled workforce was, like that in many other industries, decimated by the loss of life and markets from which it never fully recovered.

In many ways our Victorian built heritage has had a raw deal. Victorian buildings, even the grandest ones, have not in general had the same cachet given by building historians to those of earlier times. Today, a new appreciation of this now 'historic' architecture is growing. However, as cities and towns are still changing rapidly it is important that this vast heritage is not overlooked and that it is properly protected from further damage by inappropriate development.

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