

Abstracts in Periodical Literature

Compiled by Simon Pepper and Peter Richmond

SONJA ALLBÄCK and BERTIL FREDLUND, **Windowcraft** (Parts One & Two), *Journal of Architectural Conservation*, No. 1 (March 2004), pp. 53-67 and No. 2 (July 2004), pp. 7-25. History sometimes benefits from well-intentioned but misguided attempts to replace old with new. This pair of papers originated in work carried out by the authors (whose business concerns the care and maintenance of old buildings) to establish the environmental and constructional performance of traditional timber doors and windows in the face of Swedish Government efforts to encourage the use of modern triple-glazed units. The environmental performance analyses led on to studies of the original linseed oil-based paints, putty and soaps which have led to the development of a new generation of linseed oil products that do not require solvents at any stage of their use (and which are now marketed in this country through Holkham Linseed Paints, as described in a parallel paper by Viscount Coke, "Holkham Estate Returns to Traditional Materials and Craftsmanship," *Ibid.*, July 2004, pp. 26-38). Much was also uncovered on the history of the construction and finishing of Scandinavian doors and windows.

M. CABLE, **The Development of Flat Glass Manufacturing Processes**, *Transactions of the Newcomen Society*, Vol. 74, No. 1 (2004), pp. 19-44. For some two thousand years glass has been an important building material, but it is the manufacture of plain flat glass for ordinary buildings - rather than the spectacularly stained glass of the cathedrals - that has preoccupied inventors seeking economical solutions to the production of perfectly smooth (and thus un-distorting) surfaces on both faces of the sheet. "Fire finished" surfaces cut from spherical or cylindrical glass blown vessels delivered small panes with inevitable optical distortion rising from the curvature, as did "crown" glass spun into an almost (but not quite) flat disk. "Mirror" glass had to be expensively ground and polished on its moulded face to ensure a distortion-free surface. Michael Cable's paper takes the reader systematically through the historical development of the drawn flat sheet, plate glass, continuous casting, rolled plate and float glass techniques, culminating in the 1950s in the joint development by Bickerstaff and Alistair Pilkington of Pilkington Brothers of the process whereby a ribbon of molten glass flows over molten tin, forming a "lens" with almost perfectly flat surfaces.

A. CATON CROZIER, **Francis Gould Moroney Stoney, MICE (1837-1897): Victorian Engineer**, *Transactions of the Newcomen Society*, Vol. 24, No. 2 (2004), pp. 215-247. So much attention is traditionally lavished on Victorian bridges and their designers, that it is easy to overlook the achievements of the engineers who sought to control the rivers themselves. British rivers and their finely-tuned canal systems, and the great rivers of the developing world with their fearsome floods, needed to be controlled by means of dams, weirs and sluices which could both maintain water levels and flows in normal times, and respond rapidly to flood emergencies. Francis Stoney made himself the master of Victorian sluice gate design. Trained in Ulster (he was articled to Sir John Macneill following an engineering course at the Queen's College), he worked in South America and India before embarking on private consultancy in London in 1875 and shortly afterwards forming a close association with Ransomes & Rapier of Ipswich who manufactured hydraulic gates and sluices. A shrewd businessman, his equilibrium valve and improvements to the cylindrical sluice system generated numerous patents. Stoney is best known for his free-roller sluice gates. These were first used at Pelotas, Brazil (patented 1874) and employed on an enormous scale for the Manchester Ship canal (opened 1894), and for the first Aswan Reservoir (posthumously in 1899). For the earliest Thames Barrier at Richmond (1891-94)

Stoney's design allowed the raised sluice gates to be rotated horizontally to give increased headroom for river traffic and in this position to be housed unseen amongst the upper bridgeworks.

THOMAS DAY, **The Construction of Aberdeenshire's First Turnpike Roads**, *Journal of Transport History*, Vol. 24, No. 2 (September 2003), pp. 154-76. Construction of the first turnpike road in Aberdeenshire began in 1796, more than 130 years after the establishment of the first turnpike trust in England and over forty-five years after the first turnpike gate had been erected on the road between Edinburgh and Glasgow. The military roads came first, of course, but these were poorly constructed and took little account of gradients (since fit troops could be marched up much sharper inclines than civilian wheeled traffic). An initial burst of turnpike road-building activity in Scotland was taken up again during the 1830s and 1840s, with the final turnpike being completed in 1855. Coming as it did at the end of the British road building programme, Aberdeenshire benefited from many hard lessons learnt in the early projects and, argues the author, in this part of far North East Scotland the surveys to establish an optimum combination of line and incline, and construction standards enforced by commissioners and trustees were generally carried out to unusually high standards. Thomas Day's paper tells the story of the administration of these trusts but focuses on the construction of the roads themselves, and the interplay between initial investment and long term costs. Using broken rock for the metalling, costs ranged from £212 to £390 per mile, depending largely on local sources of construction-quality granite (or less commonly, whinstone or plum-pudding rock) and the availability of quarry spoil which could obviate the need to break it down into the egg-sized lumps that could be passed through an oval ring with a small diameter of $1\frac{1}{2}$ inches. If gravel was used, material prices ranged from £150 to £170 per mile. The best trusts invested heavily in drainage (ditches and masonry lined culverts) and insisted on modest run-off slopes on the roadbeds (since steep cambers encouraged all of the wheeled traffic to run in a narrow area along the centre of the road, which would quickly break up). This is probably an aspect of construction history from which contemporaries can still learn.

MILES GLENDINNING, **Teamwork or Masterwork? The Design and Reception of the Royal Festival Hall**, *Architectural History*, Vol. 46 (2003), pp. 277-319. The author's original objective in this paper was to explore the historiography of the Royal Festival Hall, one of the few iconic Modern Movement buildings in this country to enjoy widespread popular approval. Built by the LCC Architect's Department as the key permanent element in a complex cultural centrepiece for the Festival of Britain of 1951, and later of a reconstructed London, it was the product of a design process which began early in 1947 and was frequently to be cited in the years that followed as a textbook example of public sector teamwork delivering high class social architecture (albeit a public sector office that was ridden with factionalism and politics). Latterly, the revived vogue for heroic authorship has tended to identify Sir Leslie Martin as the main, or even sole designer. Disentangling questions of authorship for purposes of a biography of Sir Robert Matthew (the other key player and Martin's superior as LCC Superintending Architect) has led Miles Glendinning into an exercise in deconstruction, using primary archival records and interviews to sort out the genesis of the scheme, the key stages in the design, and the roles of different players. Not surprisingly, the conclusions point to a more "messy and polycentric process" than either of the two earlier interpretations (individual masterwork or anonymous teamwork). But it has given us a rare example of a recent design process, analysed by a critical historian, rather than by the flexible if not failing memories of the architects concerned.

FRANCIS GOODALL, **Gas in London: a Divided City**, *The London Journal*, Vol. 27, No. 2 (2002), pp. 34-50. Recent research on fuel provision has concentrated overwhelmingly on electricity, so it is welcome to find a paper tackling gas and the business structure of London's supply companies. In late nineteenth-century London there were a number of amalgamations between gas companies but, despite conventional business logic, those to the north and those south of the River Thames never came together,

while Paris, Berlin and Vienna were served by a single dominant company. This paper follows the course of the successful and failed amalgamations and describes the policies of the main protagonists. Responsibility for public lighting was very fragmented and therefore municipalization in the public interest - common elsewhere - was never practicable in London. The incipient threat of electrical competition, statutory regulation and inter-firm rivalry kept the protagonists on their toes. London companies were in the forefront of building new working class markets for gas to compensate for the gradual loss of their traditional lighting market. No evidence is found for economies of scale foregone. Indeed, the London companies performed better than their European counterparts in terms of sales of gas per customer. Personal rivalries between successive chairmen prevented the establishment of a single London gas company. It is proposed that this anomalous division in gas supply produced creative rather than destructive tension.

M. GOULD, D. CLELAND and S. GILBERT, **The Use of Prestressing and Precasting in Concrete Water Tanks and Towers in Britain and Ireland**, *Transactions of the Newcomen Society*, Vol. 74, No. 1 (2004), pp. 73-88. In a series of papers abstracted in recent years, Michael Gould and his collaborators have made themselves the leading authorities on the structural and construction history of British water tanks and towers. In this contribution they turn their attention to questions of prestressing and precasting, in both cases for tanks built at ground level and for towers. Both techniques have been widely used for water storage in the USA, but only a small proportion of the 1,000 odd concrete water towers listed by the Panel of Historical Engineering Works of the Institution of Civil Engineers employ them, although the authors observe that the visual intrusiveness of the towers favours the use of the surface textures made economically viable in precast assemblies.

LAWRENCE R. HOEY and MALCOLM THURLBY, **A Survey of Romanesque Vaulting in Great Britain and Ireland**, *The Antiquaries Journal*, Vol. 84 (2004), pp. 117-84. "If in doubt, count," someone famously observed; but very little architectural or construction history is conducted on this basis - with a subsequent scarcity of reliable data on the distribution of constructional systems, and an over-reliance on claims for primacy. The core of the work reported here is a comprehensive survey and gazetteer of Romanesque vaulting in the British Isles. Nearly universal in the undercrofts of major secular buildings, and present in all surviving church crypts, the masonry barrel vault and its groined cross vault was more selectively applied to the upper parts of great churches, concentrating on the sanctuary and aisles. High vaults are much less common than aisle vaults in English Romanesque churches of even the grandest scale, and their absence has led to charges of conservatism from architectural historians who equate vaulting with structural advance and an ineluctable movement towards Gothic. The transition between Romanesque and Gothic is normally closely related to the development of the rib, and here the survey draws attention to a regional distribution of early ribbed vaults which is entirely counter-intuitive. Ribbed vaults were it seems not only introduced but popularised in the north by the Norman reconstruction of Durham, while for many years afterwards ribs remained generally absent south-east of a line from Winchester to Peterborough. The authors attribute this to the influence and associations of Anselm's crypt and choir aisles of Canterbury Cathedral and, further suggest that the rib was initially seen as neither a structural benefit nor a constructional essential. It was not until the 1150s and 1160s, with the introduction of the rib in Prior Wilbert's buildings at Canterbury Cathedral, that the rib vault became universal for all prime locations. Even then, as in the north, barrels and groins continued in use in monastic undercrofts unto the thirteenth century.

THOMAS JÄGER, **The Art of Orthogonal Planning: Laparelli's Trigonometric Design of Valletta**, *Journal of the Society of Architectural Historians*, Vol. 63, No. 1 (March 2004), pp. 4-31. The fortified city of Valletta was built on the previously undeveloped Scceberras peninsula following the great siege of Malta by the Ottoman Turks in 1565, extending from one of the most impressive lines of bastioned

fortification hitherto constructed to the rebuilt fortress of St Elmo at the open-sea end. Between these fortifications lay the new city, one of the most complete examples of the modern urbanism sweeping through Europe, but with a surprising lack of consistency in the dimensioning of the blocks which has generally been seen as a pragmatic response to the topography of a site which sloped unevenly in two directions (and even, more surprisingly, as the result of shortcomings in contemporary surveying skills). The designer was the Italian architect, Captain Francesco Laparelli da Cortona (1521-70), chief military architect to the Pope, who was to die shortly afterwards serving with the fleet in the Lepanto campaign. The author of this fascinating paper has analysed the four surviving Laparelli street plan drawings and identified a sophisticated proportional system at work in the layout of principal and subordinate streets, conditioned by the military considerations which allowed nearly all of them to be swept by guns on the surrounding fortifications. Renaissance geometry, ideal city ambitions and military priorities thus coincide in a street plan which at first sight would not excite the sort of notice as the more spectacular (and only rarely fully implemented) radial urban schemes of the sixteenth century.

EDA KRANAKIS, **Fixing the Blame: Organisational Culture and the Quebec Bridge Collapse**, *Technology and Culture*, Vol. 45, No. 3 (July 2004), pp. 487-518. In 1907 the Quebec Bridge over the St Lawrence River was touted as one of the world's great engineering projects. Its 1,800-foot central span was going to establish a double world record, for the longest cantilever span as well as the longest bridge span. Yet as the southern half of the bridge neared completion at the end of August that year, it suddenly collapsed, killing seventy-five workers. Not surprisingly, the disaster has generated a considerable literature. Indeed it still features today in engineering degree courses as a lesson to be learnt, the lesson - according to the Canadian Royal Commission which in 1907 investigated the causes of the collapse - being errors in design by two individuals, Theodore Cooper (a New York consultant) and Peter L. Szlapka (chief designing engineer to the Phoenix Bridge Company of Pennsylvania, manufacturers and erectors of the bridge). Neither Cooper nor Szlapka had control over site operations. These were overseen by the engineer to the railway company which promoted the project, but whose financial status was such that Government money was needed, with inevitable confusion in cost control. Mistakes were of course made in the design and production process which resulted in underestimates of the final weight of a much modified design, and the consequent overstressing of the main compression chords. The author seeks to understand how these errors occurred. Professor Kranakis, a historian, is concerned not to eschew notions of individual responsibility and error, but rather to evaluate how the project functioned, how technical expertise was deployed, how complex tasks were divided and responsibility assigned, how the design process was organized and linked with other production priorities, and who had responsibility for all of these arrangements. In the course of her inquiry much is revealed about the complex organisational and financial structure of the project, the management of a super-project against tight deadlines, and the failures in management which left the senior engineers and consultants without the expected authority over the project. Those of us who relish the opportunity to learn from the great disasters in construction history will find much of interest in this paper. A number of interesting parallels are also drawn with more recent events, notably NASA's organisational shortcomings which contributed to the space shuttle disasters, and the Hyatt-Regency walkway collapse.

R. A. OTTER, **The Construction of Dry Docks to World War I: The Evidence of "The Engineer"**, *Transactions of the Newcomen Society*, Vol. 74, No. 2 (2004), pp. 197-214. The construction of dry docks was a growth industry during the nineteenth century, as both the number and size of docks increased dramatically to keep pace with the expansion of the merchant and naval fleets and the size of the ships themselves. A "large" stone dock in 1800 would have approached 300 feet in length with an entrance width of some 60 feet. Just over a hundred years later docks measuring 1,000 feet with 100 foot entrances were advocated, and concrete (or a combination of concrete and brick) had replaced stone as the principal construction material. Explosives, steam shovels and site railways were now commonly

employed to dig out the massive excavations and remove the spoil. Steam pumping equipment had transformed the age old problem of keeping water out of the "dry" dock during construction, and allowed the porous construction and pumping-out arrangements which prevented "lighter" structures being floated off their own foundations. Otter's survey of developments is based on a close reading of dock coverage in *The Engineer* which was first published in 1856, from which he has been able to compile a table showing the chief projects, their dates, dimensions, engineers and contractors.

ADRIAN PADFIELD, **Land Surveyors in the Canal Age: The Fairbanks Family of Sheffield**, *Journal of the Railway and Canal Historical Society*, Vol. 34, Part 7 (March 2004), pp. 472-9. Four generations of the Fairbank family were land and property surveyors in and around Sheffield. Records survive from 1753 to 1848 and in the Sheffield City Archives there is a uniquely extensive and valuable collection of papers (including 4,650 maps and plans, 1,026 surveyors' books, field notebooks, and account books, as well as almost 8,000 letters) informing us of their activities in connection with agricultural improvements, coal mining, roads and buildings in Sheffield and the North Midlands, and (of special interest to the author) of canal and railway construction. This has attracted the attention of scholars, notably David Crossley (whose Rolt Memorial Lecture of 1995 was abstracted in *Construction History*, Vol. 13). Adrian Padfield's paper draws on his work in another cache of 620 plans of canals (now in the British Library) including the original MS map, annotated proof copy and a final fair copy of William Fairbank II's Dear and Dove Canal survey, a 20 mile route around Barnsley which was surveyed in five days in September 1792 in a race against two other canal enterprises with their own plans for the profitable transport of Barnsley's coal. The BL cache includes a number of other schemes (often unrealised) surveyed by the Fairbanks in a period of canal construction activity carried out in all of its phases at a pace which strikes contemporary observers as frantic.

FRANK SALMON, **Perspectival Restoration Drawings in Roman Archaeology and Architectural History**, *The Antiquaries Journal*, Vol. 83 (2003), pp. 397-424. This paper is concerned with the graphic means deployed since the Renaissance to restore the appearance of Roman architecture, and specifically with the use of various forms of perspective. Disdained by architectural theorists from Leon Battista Alberti onwards because of its supposed subjectivity, the perspective none the less became a valuable tool in the second half of the eighteenth century for studying Roman architecture and urban form in pristine condition. It remained so until, with the consolidation of a more scientific approach to the discipline of archaeology in the last third of the twentieth century, it was reduced to schematic form and supplemented by isometric and axonometric projectional restorations, notably in English-language histories. The discipline of architectural history has not, however, been well served by this development, and an argument is made here for the retention of perspectival restoration and for the furtherance of the recent development of restorations modelled with the aid of computers.

P. JEFFERSON SMITH, **Before Bazalgette: The Surrey and Kent Commission of Sewers 1800-1847**, *Transactions of the Newcomen Society*, Vol. 74, No. 1 (2004), pp. 131-146. The London sewer administrations which preceded the Metropolitan Board of Works are little known and, so far as they are known, are condemned as incompetent and corrupt. This paper is a study of one of them, the Surrey and Kent Commission, which covered the whole of the then built-up area of South London and is based on the records of the Commission itself, on evidence to several Parliamentary inquiries, and on wider research into the career of Edward l'Anson senior (1775-1853), a distinguished city architect who was one of the surveyors to the Commission. The old London sewer commissions were indeed failures and were rightly wound up in 1847 because of their narrow vision, limited powers of enforcement and the financial restraints which caused them so often to turn their backs on new technology and hold back from the thoroughgoing overhaul of the drainage for what had become a big city system by the time of Bazalgette and the MBW. Edward l'Anson was certainly not technically incompetent or unscientific. He

pioneered the use of cast iron inverts to line the bottoms of his new sewers, and to support sewers in unstable ground or where unlined outflows would erode the Thames foreshore. He developed an iron penstock to control the outflow into a tidal river, and in his response to criticisms in Chadwick's Report of 1842 was able to present the health records of his Commission's workmen in rebuttal of the reformer's claim that effluvia from decomposition in the sewers was the cause of fatal disease.

R. C. TURNER et al. **The Great Tower, Chepstow Castle, Wales**, *The Antiquaries Journal*, Vol. 84 (2004), pp. 223-318. The great tower of Chepstow Castle is probably the most important surviving domestic medieval building in Wales. It was certainly one of the biggest (big enough to be seen as a Roman relic by some early antiquaries) and in its later stages seems also to have had a military role (accommodating spingards on the rooftop turrets). In the Norman period it consisted of a single large room partly surrounded by niches built over a vast undercroft. In the second quarter of the thirteenth century, the first floor was dramatically converted into a more conventional great hall and chamber, through the insertion of new windows and the construction of a pair of sumptuously decorated arches across the building in the most refined Early English style. These alterations also provided a single second-floor chamber, which was extended across the whole building in the 1290s. This article gathers together the documentary, architectural and art historical evidence in an attempt to identify who was the patron of each phase of this remarkable building and what they were hoping it would provide. It also provides detailed information on the sources of the building stone used in different phases, starting with a diverse mixture of newly quarried and re-used material (the latter possibly from Roman Caerwent), but later including a variety of locally sourced stone as well as "specials" (such as the decorative Purbeck Marble probably imported by sea from Wareham or Swanage, and the Douling stone from the Mendips). A large number of contributors have their names on the published paper.

ISOBEL WATSON, **Rebuilding London: Abraham Davis and his Brothers, 1881-1924**, *The London Journal*, Vol. 29, No. 1 (2004), pp. 62-84. This study identifies the contribution to the regeneration of late nineteenth century and early twentieth century London made by the brothers Davis. Originating in Whitechapel, six sons of Wolf Davis, a self-made furrier, prospered by building flats and workshops primarily designed for the Jewish community over a wide swathe of the inner East End. Working singly or in partnerships of two, they pooled expertise and financial and other resources, enabling Abraham Davis to transcend the failure of an ill-conceived market project in Spitalfields. He shared the interest of his brother Israel Davis in cinema construction, but was the only one of the brothers to continue in the promotion of residential building beyond c.1909, frequently acting as his own architect. Of the brothers he has made the greatest impact on the continuing London streetscape, with projects originating after this time. From about 1908 he initiated a web of companies and public utility societies (including the London Housing Society and the Lady Workers' Homes) which promoted soundly-built blocks of flats in St Pancras, Maida Vale and St John's Wood and exploited government housing finance, especially post-1919. A borough councillor in St Pancras, up to the time of his death he took a leading part in post-1919 public housing construction in the borough. Whereas his brothers were speculative builders and no more, Abraham Davis's career is unusual among builders in adding a dimension of public benefit.

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