

Abstracts of Periodical Literature

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RICHARD BETTS, **Structural Innovation and Structural Design in Renaissance Architecture**, *Journal of the Society of Architectural Historians*, LII, 1 (March 1993), pp.5-25. The state of modern scholarship on the question of structural innovation is curious. We should know far more about Renaissance than Medieval structures because of the body of published theory and the surviving drawings and documents which illuminate the later period. Yet so much more effort has gone into solving the mysteries of Medieval design which – despite the efforts of Mark, and James (qv) – may never be fully understood. Betts here takes issue with those who assume too readily the Renaissance revival of Roman structural methods, in a paper which argues that the characteristic structural forms of large late fifteenth century churches – domes, drums, pendentives and barrel vaults – were the products of real innovation in theory and practice culminating in Bramante's projects for the new St Peter's (the structural shortcomings of which have caused much unjust opprobrium to be heaped upon "Bramante rovinante"). Significant ideas were contributed by Alberti, Francesco di Giorgio and Leonardo da Vinci. Francesco di Giorgio's geometrical design method for churches (described in his second treatise) incorporate a procedure for calculating the thickness of vault-bearing walls, a method which was tested in Francesco's own churches and was later employed by Bramante.

LOUIS CHAURIS, **Coupeurs de goémon contre tailleurs de pierre: cas de luttes pour la possession de l'estran en Bretagne au XIX siècle**, *Annales de Bretagne*, 100, 1 (1993), pp.121-127. The title almost says it all. Archival material on the Ile Grande, the bay of Morlaix and the Roads of Brest is employed to illustrate the conflict between seaweed cutters and stone hewers working the same shoreline in the 19th century. Seasonal seaweed harvesting was, of course, threatened by the removal of litoral stone throughout the year for public construction projects such as the railway viaduct of Morlaix and the commercial port of Brest. The clash of interests between two extractive industries, both accustomed to raid "common" seashore sites, sheds an interesting light on the supply of building materials.

VIRGINIA TUTTLE CLAYTON, **The Hudson River Villas of Upper Manhattan: Rediscovered Maps and Plans**, *Journal of Garden History*, 12, 4 (1992), pp.269-297. An account of the survey drawings prepared between 1860 and 1864 for a proposed city planning project that was to have been headed by Frederick Law Olmstead and Calvert Vaux. The author's use of the plans is as a source for the now long lost villas and gardens of this part of North Manhattan; but the survey bears on what would have been Olmstead and Vaux's first major planning scheme, and sheds light on the development process in New York during the Civil War.

ALEXANDER JAMES FIELD, **Uncontrolled Land Development and the Duration of the Depression in the United States**, *The Journal of Economic History*, 52, 4 (December 1992), pp.785-805. Aggregate economic activity was heavily influenced by the US construction sector's expansion, collapse and failure to revive during the interwar years. The 1920s building boom (largely comprising single family detached houses) was the first to respond to the potential of the automobile and the last to be largely unplanned. Its uncoordinated character slowed the growth of

full employment output toward the end of the 1920s. The physical and legal detritus of unregulated land development posed continuing obstacles to recovery during the 1930s.

PETER A FORD, Charles S Storrow, **Civil Engineer: A Case Study of European Training and Technological Transfer in the Antebellum Period**, *Technology and Culture*, 34, 2 (April 1993), pp.271-299. Charles Storrow (1809-1904) rose to distinction as a railroad engineer and as urban planner and civic leader for the textile city of Lawrence, Massachusetts, where in the late 1840s he designed and constructed an entire industrial community, including the Great Stone Dam, an imposing granite structure that ranks as one of the monuments of 19th century American engineering. Unlike most of his contemporaries, Storrow received his education abroad. After Harvard he spent two years (1830-32) studying at the École des Ponts et Chaussées in Paris, travelling widely in France and England to meet prominent scientists and to visit major engineering works. Recent years have seen a growth of interest in the transfer and diffusion of technology between Europe and the United States in the early 19th century. Ford's paper concentrates on these aspects of Storrow's career as an engineer influenced by the scientific and intellectual milieu of the Parisian institutions. As such it strikes an interesting contrast with the tendencies described in Seely's paper (qv).

JOSHUA B FREEMAN, **Hardhats: Construction Workers, Manliness and the 1970 Pro-War Demonstrations**, *Journal of Social History*, 26, 4 (Summer 1993), pp.725-744. When in the spring of 1970 construction workers in New York and St Louis violently attacked anti-Vietnam War demonstrators, an image of the "hardhat" was fixed in popular consciousness: journalists, politicians, social scientists, novelists and movie-makers portrayed building tradesmen as the rudest, crudest, and most sexist of all workers. For some, hardhats were "real men", more willing than other Americans to defend their country and its values from enemies abroad or at home. For others, hardhats were ominous figures: politically reactionary, pathologically violent, and deeply misogynist. This interesting article examines these stereotypes and relates them to wider changing perceptions of manual workers.

GERT GROENING, **The Idea of Land Embellishment**, *Journal of Garden History*, 12, 3 (1992), pp.164-182. Part of the journal's German issue, this article by a professor at the Hochschule der Kunste, Berlin, describes the efforts of officials of the state of Bavaria to promote the orderly development – or, more frequently, the orderly re-arrangement – of rural villages during the 1820s. The polar opposite of the contemporary picturesque tradition of village planning in this country, the schemes were implemented in numerous villages and promoted more widely through the pages of a state-funded monthly journal.

CHRISTOPHER HAMLIN, **Edwin Chadwick and the Engineers, 1842-1854: Systems and Antisystems in the Pipe-and-Brick Sewers War**, *Technology and Culture*, 33, 4 (October 1992), pp.680-709. Edwin Chadwick's great monument is the system of waterworks, sewers, ventilated streets and the byelaw houses built under various Public Health measures for which he campaigned. However, his career as a public health official lasted only from 1848 to 1854 and ended in controversy when he was expelled from the General Board of Health. At the centre of Chadwick's difficulties with what he saw as political vested interests was a now obscure technical argument over sewer design, the "pipe-and-brick" sewers war of 1852-54. On one side were Chadwick and a handful of marginal engineers who advocated a novel system of small-bore pipe sewers; on the other, prominent members of the Institution of Civil Engineers – notably Thomas Hawksley and Thomas Bazalgette – who opposed this view. At the heart of the disagreement were conflicting views of good engineering. Chadwick's allies thought in terms of

"systems" while the orthodox engineers adhered to an explicitly decentralised and anti-systems approach. In opposing Chadwick's centralised system and calling for situation-specific solutions, these engineers echoed modern appeals for appropriate technology.

JOEL HERSCHMAN, review of Xavier Barral I Altet (editor), *Artistes, artisans, et production artistique au Moyen Age*, 3 vols, Paris, Picard, 1986-90 in *Journal of the Society of Architectural Historians*, LI, 3 (September 1992), pp.330-1. These are the published proceedings of the International Colloquium on the history and technology of medieval art, held over five days in 1985 at the University of Rennes. Volume 1, *Les Hommes* (1986) covers the training and working methods of the artists and artisans and their relationships with patrons. Volume 2, *Commande et travail* (1987) discusses funding of art work – today we would probably call it procurement – and the impact of the variety and availability of raw materials. Volume 3, *Fabrication et consommation de l'oeuvre* (1990) continues the matter of volume 2 with a discussion of mass production techniques, markets and export. Perhaps not surprisingly, the reviewer finds little coherence in the offerings of over one hundred contributors, but points out that over one-third deal with building construction. There is a mass of useful material in these volumes and a good index.

JOHN J HERMANN JR AND VINCENT BARBIN, **The Exportation of Marble from the Aliki Quarries on Thasos: Cathodoluminescence of Samples from Turkey and Italy**, *American Journal of Archaeology*, 97, 1 (January 1993), pp.91-103. Over the last decade a useful technique for marble identification has been developed, based on the analysis of stable isotopes of carbon and oxygen. Isotopic values within a single ancient quarry of white marble vary within a relatively limited range. Isotopic "signatures" have been established for many of the ancient quarries of white marble in the Mediterranean basin, including most of those known from literary sources. However, there is some overlap between quarries with very similar signatures, which can now be eliminated by the use of Cathodoluminescence (the excitation of a mineral by an electron beam), the two techniques used together providing reliable identification from very small samples. This technique has allowed the authors to plot the export of marble in both finished and unworked blocks from the quarries of Thasos to numerous sites in Italy and Turkey. Valuable insights are gained on the long range supply of building materials in the ancient world.

HARRY HODSON, **The Iron Bridge: Its Manufacture and Construction**, *Industrial Archaeology Review*, XV, 1 (Autumn 1992), pp.36-44. The author was responsible for the construction of the model of the Iron Bridge in the Museum of Iron in Coalbrookdale. Unlike earlier models in the Science Museum and the Royal Scottish Museum, both in timber, an aluminium alloy was used here in an effort to replicate the original castings at a scale of 1:33. The castings were then assembled in the workshop using a restricted space equivalent to the confined area at the foot of the Severn Gorge. All of this enables Hodson to infer the method of assembly of the actual bridge. The paper includes an English translation of Rochefoucauld's description of his visit to the bridge and ironworks at Coalbrookdale on 14-15 March 1785.

ROGER HOLDEN, **Structural Engineering in the Lancashire Cotton Spinning Mills 1850-1914: the example of Stott and Sons**, *Industrial Archaeology Review*, XV, 2 (Spring 1993), pp.160-176. Stott and Sons were one of the major firms of mill architects in Lancashire, being responsible for some 20 percent of new cotton spinning mills built in that county between 1880 and 1914. Their early buildings were Fairbairn type mills with single brick arches supported by cast iron columns and beams. After 1870 they developed this system further in order to provide a floor of minimum thickness with maximum free floor space and window area. New materials

were employed, first rolled iron and then steel were used to replace the cast iron beams, although cast iron columns were retained. They continued to use brick arches but after 1890 began to use concrete floors as well, although other architects had already made the change by this date. In making these advances Stott and Sons obtained two patents, in 1871 and 1885.

JOHN JAMES, **Evidence for Flying Buttresses before 1180**, *Journal of the Society of Architectural Historians*, LI, 3 (September 1992), pp.261-287. The origin of the flying buttress is crucial to our understanding of the evolution of Gothic architecture. Without it, tall, glass-encased buildings like Beauvais Cathedral would not have been possible. Recently scholars have begun to question the categorical assertion of Lefevre-Pontalis (1919) that the first flying buttresses were those intended for the nave of Notre-Dame in Paris around 1180. John James – well known for his work on the masonry and building campaigns at Chartres – marshals the contrary views, reviews the documents, and contributes his own study of stonework details to conclude that certainly four (and possibly as many as fourteen) buildings employed flying buttresses before Notre-Dame. Historians of technology will find much useful material here on the near simultaneity of both innovation and diffusion of an important structural development.

ALISON KENNEY, **Catalogue of the Archives of the Manchester Society of Architects**, *Bulletin of the John Rylands University Library of Manchester*, 74, 2 (Summer 1992), pp.37-63. The Manchester Society of Architects has been the most influential and long-lasting professional body of architects in the city. Established in 1865, it is now in its 128th year. The Society aimed to establish a code of professional practice and charges, to arbitrate in disputes involving members and their employers, to ensure fair play in architectural competitions, to promote the status of the architectural profession, improve the education of younger members and establish a library. This article charts the development of the Manchester Society, its activities and its changing relationship with the RIBA by way of introduction to a detailed catalogue of the minute books, annual reports, Kalendar and other records.

RICHARD LONGSTRETH, **review of Robert Bruegman, Holabird and Roche, Holabird and Root: An Illustrated Catalog of Works** 3 vols (New York and London, Garland, 1991) in *Journal of the Society of Architectural Historians*, LI, 2 (June 1992), pp.208-210. Holabird and Roche and their successor firm of Holabird and Root was one of the biggest and most successful firms of Chicago architects in the late nineteenth and early twentieth centuries. Longstreth's enthusiastic review of Bruegman's catalogue raises numerous interesting points on the lessons to be learnt from the study of all 1,530 projects (roughly one-third unbuilt) tackled by the firm from 1880 to the eve of World War II, and suggests that these volumes represent a distinctive new approach to the presentation of professional and business history. Not a compendium of reproduced drawings, correspondence, or other archival matter, the catalogue's 1,530 entries are arranged chronologically, each entry giving basic data (including original and subsequent building names, address, dates, status, associated architects, client and cost), brief physical description, notes on the kinds and whereabouts of surviving drawings, and the project's "history" (which can run to several pages). All of this is meticulously indexed as a resource of major importance for other researchers, although Bruegman's monograph (expected shortly) will be first in the field.

GARY MARSHALL, MARILYN PALMER AND PETER NEAVERSON, **The History and Archaeology of the Calke Abbey Lime Yards**, *Industrial Archaeology Review*, XIV, 2 (Spring 1992), pp.145-176. The Harpur-Crewe estate in Derbyshire, now the property of the National Trust, possesses what is probably the largest concentration of lime-pits and lime-kilns in Great Britain. Through the fortunate survival of the estate papers, it has been possible both to

reconstruct the history of the lime-yards and to relate the documentary and physical evidence. Selective excavation of kilns in the yards has enabled the construction of a typology for the late eighteenth and nineteenth centuries.

EDWARD MARTIN, **Two Exceptional Tudor Houses in Hitcham: Brick House Farm and Wetherden Hall**, *Proceedings of the Suffolk Institute of Archaeology and History*, XXXVII, Pt 3 (1991), pp.186-207. A description of two (possibly) unique buildings in central Suffolk. Brick House Farm has an early Tudor brick base, with unusual hexagonal turret corners with elaborate profiles, and panelled walls of knapped flint flushwork alternating with brick in a chequerboard pattern. The roof, upper storey and finely decorated interiors are of a later date. The author believes the building may have originated as a high class hospice or lodgings for the Bishopric of Ely. Wetherden Hall close by is now a lengthy 14-bay timber-framed building, but originally consisted of 21 bays to give it the exceptional length of 210 feet – all constructed apparently in a single build along one side of a moated platform.

ANDREA MATTHIES, **Medieval Treadwheels: Artists' Views of Building Construction**, *Technology and Culture*, 33, 3 (July 1992), pp.510-547. The hoisting machines used to erect the great churches of the Middle Ages can be known only imperfectly from existing archival sources and archaeological remains. Andrea Matthies supplements these sources by the perceptive use of medieval manuscript illuminations providing visual information on the development and structure of hoisting machines – from the simple windlasses to the great treadwheels. She also talks to modern workers who have used these ancient machines (such as that in the Bell Harry Tower at Canterbury Cathedral, which was still in use during the 1970s). Her article develops the typology of early spoke-arm and crank-type windlasses and their evolution into larger compass-arm and clasp-arm treadwheels. It also contains information on early slewing and pivoting cranes. Matthies' earlier paper on the wheelbarrow (abstracted in *CH* vol 8) and this work on hoisting devices together mark an important development in the history of construction technology.

DAVID MILSON, **The Bronze Age Temples at Troy (VIC) and Hazor (Area H): A Design Analogy**, *Palestine Exploration Quarterly* 124 (January-June 1992), pp.31-41. Ancient historians and archaeologists are as anxious as the Medievalists to understand the systems and methods governing the dimensions and layout of early buildings. This paper notes the recurrent use of the same dimension in three Bronze Age temples at Megiddo (25 Mesopotamian cubits of 0.5485 metre) and in the gate structure and Middle Bronze Age fortress temple at Shechem, and goes on to identify similar dimensional concurrences at Troy, Megiddo, Alalakh and Hazor. Using the kind of geometrical analysis well known to students of the medieval masons and their methodology, Milson demonstrates the possible significance of a diagram (a square with diagonals and dimensions) published in 1945 from an Old-Babylonian Tablet YBC (Yale Babylonian Collection) 7289.

ELIZABETH C MUSGRAVE **Women in the Male World of Work: The Building Industries of Eighteenth Century Brittany**, *French History*, 6, 1 (March 1993), pp.30-52. Although women featured in the "diverse and unusually fluid" building industry of eighteenth century Brittany, their work – whether as wives or widows – did not give them the same social or economic status as men. A woman's work in the construction trade was that of a craftsman's assistant; a wife was not identified as an independent worker but as a craftsman's spouse; a widow was still constrained by the contracts and partnerships formed by her late husband. Female labourers earned less than men: women won less profitable contracts and they had greater

difficulties attracting and retaining workers. The restricted female access to craft skills led to gender-specific work, even in those few trades where female participation was appropriate.

LINDA ELAINE NEAGLEY, **Elegant Simplicity: The Late Gothic Plan Design of St Maclou in Rouen**, *Art Bulletin*, LXXIV, 3 (September 1992), pp.395-422. When the merchant families of the parish of St Maclou undertook the restoration of their church in the 1430s, they brought Pierre Robin, the former Sergent d'armes et maçon général of Paris to the English-occupied city of Rouen. On May 12, 1437, Robin presented the treasurers with a complete drawing of the church and then disappeared – together with the drawing – from the documented record. The lost drawing no doubt included a ground plan that was scrupulously followed for the next 50 years and which introduced a number of novel Flamboyant features (polygonal porch, axial pier, interlocking radiating chapels and radiating bays) which are seen as intentional, undistorted by extraneous factors and not, as Focillon has suggested of the late Gothic Flamboyant, “witness to great confusion of thought”. Neagley’s article seeks to unravel the scheme from the missing drawing and advances a number of ideas about the system used by the late Gothic masons to specify and control the dimensions of sacred buildings.

G H PIRIE, **Railway Ganging in South Africa c. 1900-37**, *The Journal of Transport History*, 3rd series, 14, 1 (March 1993), pp.64-76. Wherever the life and work of ordinary railway construction labourers is researched, the shortage of evidence is a major obstacle. This investigation of gangers in southern Africa taps the records of the South African Church Railway Mission which was intimately involved with the construction and maintenance crews during the first half of this century. There are useful bibliographical references to studies of railway construction workers in a number of different countries.

KONSTANTINOS D POLITIS, **The Stepped Dam at Wadi El-Jilat**, *Palestine Exploration Quarterly*, 125 (1993), pp.43-49. The stepped dam at Wadi el-Jilat is one of the most important and certainly one of the most impressive hydraulic engineering structures in Jordan. Possibly Roman in origin – but perhaps an even earlier Nabataean structure – it is still standing 58 metres long, 5.5 to 5 metres thick and 6.2 metres high. Reinforced by projecting stepped buttresses projecting some 3 metres on the downstream side of the dam, the main wall itself is made from squared masonry, thickening in sixteen steps towards the base.

SERGIO L SANABRIA, **A Late Gothic Drawing of San Juan de los Reyes in Toledo at the Prado Museum in Madrid**, *Journal of the Society of Architectural Historians*, LI, 2 (June 1992), pp.161-173. The Franciscan monastery of St John the Evangelist in Toledo was built shortly after Ferdinand and Isabella’s victory at the battle of Toro in 1476, where they defeated the Portuguese supporters of Juana, Isabella’s niece and rival for the throne of Castille. The church was extended in the 1480s and 1490s to incorporate a royal mausoleum. This part of the church is depicted in the interior cavalier-perspective of the transept and sanctuary, unique in the corpus of Gothic architectural drawing. Discovered in 1836 amongst paintings removed from the monastery, it is a presentation drawing showing architectural elements plus a decorative and iconographic programme of a *retaldo*, inscriptions, sculpture and stained glass. Its unusual optical structure permits accurate representation of a dense collection of details to be executed by masters from various trades. The Toledan architect and sculptor, Juan Guas, has so far been accepted as sole author of the drawing, but Sanabra suggests the intervention of others. This is an important paper for all those interested in the development of drafting techniques and the collaborative design process.

GLENN M SCHWARTZ AND HANS H CURVERS, **Tel al-Raqai 1989 and 1990: Further investigations of a Small Rural Site of Early Urban Northern Mesopotamia**, *American Journal of Archaeology*, 96, 3 (July 1992), pp.397-420. The paper reports progress on the joint dig of Johns Hopkins University and the University of Amsterdam into a small site occupied in the early and middle third millennium BC, and includes a description of the mud-brick wall of a Rounded Building of the platform type: “... discreet mud-brick wall segments rectangular in plan, ranging from 1-2 m in length and width, were constructed adjacent to each other, and the (wedge-shaped) space between them, wider towards the outside, was filled in with brick fragments and mud ... The Rounded Building is unique for its period thus far, but parallels can be cited in the Jemdet Nasr-Early Dynastic II period round buildings from the Hamrin region of central Iraq. While the Hamrin round buildings are composed of concentric circles ... similarities include the size of the structures, the use of corbelled vaults, and the presence of mud-brick platforms...” (p410)

BRUCE SEELY, **Research, Engineering, and Science in American Engineering Colleges: 1900-1960**, *Technology and Culture*, 34, 2 (April 1993), pp.344-386. In 1872 the catalogue of the University of Illinois’s engineering college told students, “This school is designed to make good practical engineers.” By the end of the century this goal still guided most American engineering educators, but by the second half of this century “practical” or “shop based” education had given way to scientifically derived theory expressed through the language of mathematics. The central argument in this paper is that changes in academic research were crucially important to the transformation of engineering education during the 20th century. The emergence of new goals and a new style of academic engineering research encourage the widespread adoption of an approach to engineering education that derived not only its methods, but also its orientation and values, from science.

RUTH SERGEANT, **John Medland Clark 1813-1849: “Sometime Architect of Ipswich”**, *Proceedings of the Suffolk Institute of Archaeology and History*, XXXVII, pt 3 (1991), pp.348-249. Brief but detailed biography of an architect responsible for a variety of fine buildings in Ipswich in the nine years he spent in that city prior to his death at an early age in 1849. Ms Sergeant’s detective work illustrates the career of a talented designer in the early days of architecture as a recognised profession in this country. Despite his abilities, Clark was bankrupted by property speculation shortly before his death.

DENIS SMITH, **The Works of William Tierney Clark (1783-1852)**, *Civil Engineer of Hammersmith*, *Transactions of the Newcomen Society*, 63 (1991-92), pp.181-207. Orphaned at an early age, Clark served an apprenticeship to a Bristol millwright before becoming a mechanic at the Coalbrookdale Ironworks. There his talents were recognised by John Rennie, who in 1808 employed him at his own Albion ironworks, Blackfriars, where he was engaged on a number of major structural projects and began a lifetime’s friendship with Rennie’s sons. In 1811 Rennie recommended him for the post of Engineer to the West Middlesex Waterworks Company, which he held for 41 years. With this bread and butter job behind him, Clark was able to take on a variety of independent structural engineering commissions, building suspension bridges at Hammersmith, Marlow and New Shoreham, the Gravesend Pier, and the iron arched North Parade Bridge at Bath. He was elected FRS in 1837 and by then had been commissioned to design the suspension bridge connecting the Hungarian cities of Buda and Pest across the Danube.

MARGARET SUPPLEE SMITH AND JOHN C MOORHOUSE, **Architecture and the Housing Market: Nineteenth Century Row Housing in Boston’s South End**, *Journal of the Society of Architectural Historians*, LII, 2 (June 1993), pp.159-178. Historical and quantitative

methods are combined to determine the market response to the speculatively built row (terrace) house. A hedonic price index is used to decompose the purchase price into a set of prices for different characteristics, including design features – thus revealing the market's response to aesthetics. The general homogeneity of South Boston's 3,500 row houses, coupled with the variety of special architectural features, allows the authors to price different aspects of the house. Lot size, house size and location explain on average 74 per cent of the sale price, but architectural style and special features (ie brownstone instead of brick as the principal facing material) explained 14 per cent – or more when such features served to differentiate a row house from its neighbours. Their conclusion: design matters in the market place. A final note explains the statistical method.

ROBERT L VANN, **Vaulting Tubes from Caesarea Maritima**, *Israel Exploration Journal*, 42, 1 (1993), pp.29-34. The term *tubi fitili* has been used to describe vaulting tubes, small terracotta cylinders open at one end and closed at the other. The closed end terminates in a truncated nozzle enabling it to fit into the open end of another tube. A small amount of mortar bonded each pair and the resulting arches, built up from both sides of the room to be spanned, met in the centre with a "keystone" tube open at both ends. The joint between each pair was flexible, so that a semi-circular ring was easily constructed. A series of these arches became a lightweight vault, to which heavier construction could be added. Vault construction on tubular supports is most common in North African Roman Imperial sites, although recent work in Sicily suggests that the origin of this building technique is perhaps 400 years earlier. Examples have been found in Britain, the North Adriatic, and the Eastern Empire. The 5th-6th century church of the Annunciation in Nazareth employs tubes, and is so far the latest known use of the technique. The paper abstracted here reports the discovery of vaulting tubes in an area of unstratified fill in Caesarea harbour.

TODD WILMERT, **Heating Methods and their Impact on Soane's Work: Lincoln's Inn Fields and Dulwich Picture Gallery**, *Journal of the Society of Architectural Historians*, LII, 1 (March 1993), pp.26-58. Sir John Soane's years of practice (1768-1835, by his own account) saw tremendous advances in central heating. In advanced buildings stoves and fireplaces were supplanted by hot air, steam and water systems. Soane designed expressive stoves, and fireplaces remained especially important to him because of their cultural associations, but he also recognised the possibilities of central systems and exploited them as they became available. The result is a compelling dialogue between his architecture and the diversity of available heating strategies. Todd Wilmert of the University of Minnesota draws heavily on Soane's lectures at the Royal Academy to show his awareness of contemporary advances and, in doing so, provides an excellent account of early environmental technology in Britain.