Abstracts of Periodical Literature

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These abstracts are selected from personal scrutiny of a large number of archaeological, architectural, art and historical journals which reflect my own interests and, I hope, those of readers. Where an abstract forms part of the original publication it is generally used, but it is often edited to bring out those aspects of the content which are likely to be of particular interest to readers of this journal without – it is hoped – doing violence to the intentions of the author(s). Where no abstract is provided, I have done my best to summarise the content and thrust of argument, genrally by extracting key sentences or short passages from the text. Some of the abstracts are written from scratch by myself.

Readers are referred to the very comprehensive bibliography published annually as a supplement to Technology and Culture, the journal of the Society of the History of Technology (SHOT) whose valuable articles are so often abstracted in this section.

I am very grateful to readers who have sent offprints of their own publications for abstracting in this journal. If readers are aware of papers published in journals which do not appear to be in my own sphere of interest and reading, I would be most grateful for the opportunity to follow up on suggestions.

ROBERT L. ALEXANDER, **The Riddell-Carroll House in Baltimore,** *Winterthur Portfolio*, 28, 2/3 (Summer/Autumn 1993), pp. 113-139. The recent organisation of some family papers in the Maryland Historical Society led to the identification of 156 items documenting the construction in 1810-11 of the brick-built residence of Judith C. Riddell (1774-1863) in Baltimore. This group of documents (which includes the tender plans and specification) provides a unique opportunity to study the process of costing, planning, building, and finishing a house of the federal period. They record both standard practices and unusual ones, such as wall treatments, in the technology of the period. Their dates provide an accurate chronology of the construction process. The author has added some useful supporting research on the running water supply system and the Rumford kitchen stove system, which combined to make the servicing of this private house most advanced for its time.

D. D. ANDREWS, TIM ROBEY, PAT RYAN and IAN TYERS, **The Granary at Cressing Temple**, *Essex Archaeology and History* 25 (1994), pp.79-106. Cressing Temple is best known for its two thirteenth-century barns, but this paper analyses the fabric of another imposing agricultural building, known as the Granary, which forms part of the farm complex acquired by Essex County Council in 1989 to safeguard its architectural heritage. The paper concludes that the Granary was built in 1623 as a maltings, with a grain store on the upper floor. The re-used timbers employed for the construction of the Granary are shown to be of considerable interest and are related to the management of local woodland following the suppression of the Templars in 1312. The paper is one of a series on buildings in this volume which includes, inter alia, ADRIAN B. GIBSON on **The Constructive**

Geometry in the Design of the Thirteenth-Century Barns at Cressing Temple (pages 107-12), BRENDA WATKIN on **The Buildings of Littley Park** (pages 125-33), D. F. STENNING on the construction sequence for **The Red Lion Hotel, Colchester** (pages 135-59) which was begun in the sixteenth-century, and JOHN WALKER on **A Lodging Range at Newland Hall, Roxwell, Essex** (pages 160-73) involving a sixteenth-century addition to a medieval manor.

BRIAN CARNE, **Thomas Fulljames, 1808-74: Surveyor, Architect, and Civil Engineer,** *Transactions of the Bristol and Gloucestershire Archaeological Society* CXIII (1995), pp.7-20. Thomas Fulljames's family came from Kent, where his father practised as a land surveyor before moving to Gloucestershire to join a brother already established in the west as a commissioner for as many as thirty inclosure awards. Thomas trained in the Birmingham office of Thomas Rickman (1776-1841), probably the greatest pre- Victorian Gothicist, and opened his own office in Gloucester in 1830. Most of his work was unsurprisingly Gothic but, like Rickman himself, he was happy to work in Grecian style when called upon to do so. In 1831 he was appointed County Surveyor with responsibility for oversight of bridges and public buildings and the opportunity for occasional major commissions (such as the new three-storey Pentonville-style cell block for Gloucester Prison which occupied him in 1844-50). Even after his resignation the connections from this official post brought him further workhouses, almshouses and asylums. Another official post of Diocesan Surveyor (1832-1870) involved surveys of benefice property throughout the diocese, two new churches and a host of restorations. Bread and butter work of this kind brought him a solid income but it was probably good for his local reputation that nothing came of a mad scheme – illustrated in Brian Carne's paper – for a tidal barrage over the River Severn carrying a railway (1849). See also the entries under Geraghty and Holden for other provincial architects who used surveyorships as stepping stones into private practice.

LOUIS CHAURIS, **L'extraction du granite rose de l'âle Callot et son emploi dans le pays de Morlaix (Finistäre),** *Annales de Bretagne et des Pays de l'Ouest* 102, 1 (1995), pp. 7-34. The charting of numerous ancient extraction sites of Callot granite on the island and the neighbouring reefs in the bay of Morlaix, the systematic examination of the different building types (religious buildings, castles and manors, urban and rural) in the entire Morlaix region, and the less plentiful archival references all reveal the importance in the past of the beautiful red building stone, which is now completely forgotten. The spatial distribution of these buildings underlines the major role played by maritime transportation of this granite throughout the Bay of Morlaix extended by the Roads of Dossen and Peuzé; and confirms its long-term use (particularly from the seventeenth to the early nineteenth-centuries), despite the availability of other good quality regional granites. M. Chauris is Director of Research CNRS, at the University of Western Brittany in Brest, and has a particular interest in the exploitation of coastal resources (see the paper abstracted in *Construction History*, Vol.9).

M. M. CHRIMES, **Hugh McIntosh (1768-1840), National Contractor,** *Transactions of the Newcomen Society* 66 (1994-95), pp. 175-192. Published historical studies of the civil engineering contractors are still rare, despite the recent work on Jolliffe and Banks, the Pinkertons, Mackenzie and Brassey and a number of other early public works contractors whose activities are usefully summarised in this paper. Its thrust is the biography of Hugh McIntosh, who came from farmworking origins in Scotland to labour as a navvy on the final stages of the Forth-Clyde Canal under Robert Whitworth (1739-99) before moving south to

work on Whitworth's Leeds-Liverpool Canal, and then to take on contracts in his own name for the Lancaster Canal, where the engineer was Rennie. Contracts on the East India Docks and the Grand Trunk Canal in the early years of the nineteenth-century provided the basis of his fortune, but roads, gas and waterworks, naval dockyards and railways occupied him in the teens, twenties and thirties. He died in 1840 (of apoplexy during a meeting with his agents for northern railway contracts) leaving a fortune of £300,000 plus considerable real estate, more than any other civil engineering contractor to that date. "A very litigious person", in Sir John Rennie's words, McIntosh retained a lawyer (and later made use of his lawyer son) to pursue claims. He also relied heavily on site agents to supervise far-flung contracts; many of these subordinates later becoming well-known and prosperous in their own right. In the absence of McIntosh's business records, the information in this paper has been pieced together from evidence surviving elsewhere. This is valuable detective work.

MICHAEL D. A. COULTER, **Patterson's Spade Mill, Northern Ireland,** *Industrial Archaeology Review* XVIII, 1 (Autumn 1995), pp. 96-105. Although the Irish contribution to the armies of navvies in Britain and North America is well known, the tools which they used – and their local manufacture – tend to be taken for granted, if not totally ignored. Before the middle of the eighteenth-century most spades used in Ireland were made by blacksmiths. The first documentary mention of a spade mill was in the late 1760s, but by the early nineteenth-century the majority of spades were produced in specialised mills; 60 out of the 67 known Irish spade mills being located in the industrialised northern counties where more than 170 recognised spade designs were manufactured for a variety of construction, farming and peat-cutting roles. Patterson's spade mill was the last Irish mill to produce spades by traditional methods, using a water- powered tilt hammer. The Patterson family made spades for at least five generations, ceasing production only in 1990 when the last active worker died. The mill is now owned by the National Trust.

THOMAS DAY, **Telford's Aberdeenshire Bridges,** *Industrial Archaeology Review* XVII, 2 (Spring 1995), pp. 193-207. Thomas Telford was engineer to the Commissioners of Roads and Bridges in the Highlands of Scotland from 1803 until his death in 1834, during which period he was heavily involved in engineering projects elsewhere in Britain. This archive-based study throws light on the working relationships between Telford and a large number of lesser known but highly competent engineers during the construction of five bridges in Aberdeenshire. Although the projects were not structurally innovative and posed relatively few technical problems, the correspondence generated by Telford's peripatetic professional life provides much useful information on the costs, and the logistical and labour difficulties associated with major engineering works in sparsely populated areas.

JAY D. EDWARDS, **The Origins of Creole Architecture,** *Winterthur Portfolio* 29, 2/3 (Summer/Autumn 1994), pp. 155-189. Anthropologists as well as historians of technology have long recognised that independent invention is rare, and that people are better at borrowing the ideas of their neighbours than they are at inventing their own out of whole cloth. This belief underlies the author's observation that the plans and other architectural features of the colonial houses of the Spanish Caribbean, their French and English derivatives in the Antilles, and the Creole cottages of the Gulf coast and the Chesapeake Tidewater share too many features to be historically or culturally unrelated. Because many settlers of the Gulf and the Tidewater had spent considerable time in the West Indies, there is good reason to suspect cultural diffusion to be in large measure responsible for the un-European geometry of these Southern US houses. The author argues that so profound was

this influence that a revised history for the vernacular architecture of eastern North America is necessary. His own contribution to this process is a model of typological study.

P. J. GERAGHTY, **P. J. Dodd of Drogheda, Architect and Civil Engineer,** *Journal of the Old Drogheda Society* 9 (1994), pp. 7-37. Patrick Joseph Dodd, known professionally as PJ, was born in Dublin in 1848 and, following emigration to the USA at an early age, returned to Ireland in 1865 and joined the architectural office of Charles Geoghegan. In the same year he joined and dropped out (for non-payment of tuition fees) the first Class for Architectural Study established by the RIAI. In 1867 Dodd left Geoghegan for the position of second assistant county surveyor for Louth, now working on bridges and roads, and gaining the engineering experience which was to win him the post of Superintendent to the Boyne Canal in 1870, to which he added in 1874 the post of Superintendent to the Board of Guardians for the Drogheda Union. In addition to the engineering, workhouse and hospital responsibilities of these public posts, Dodd took private commissions for churches, schools and cottage housing and for part of his career served as Captain of the Volunteer Fire Company. When he died at the early age of 49 in the influenza epidemic of 1891-2 he left a widow and five children and an estate worth over £2,000 not counting the hotel, pub and sweet shop which his widow was able to manage profitably until her own death in 1897. Geraghty's paper is a welcome addition to the growing fund of biography which deals with the second and third tier of provincial architects, engineers and property developers during the formative stages of the modern professions. (See also entries under Carne and Holden.)

A. TREVOR HODGE, **In Vitruvium Pompeianum; Urban Water Distribution Reappraised,** *American Journal of Archaeology* 100, 2 (April 1996), pp. 261-76. Vitruvius's account of the layout and design of the *castellum divisorium*, the tank in which water entering a city by an aqueduct is divided up to supply various users, is well known, much discussed, but to many still confusing. Given the inevitable seasonal fluctuations in water supply from an aqueduct, the Vitruvian system was designed to allocate any surplus and accommodate any shortfall within set priorities. This study focusses on the primary castellum at Pompei (one of only two substantial survivals). The pipes delivering water to the city are far too large all to have been filled by the small aqueduct, while within the *castellum* the arrangements for dividing up the water, by Vitruvius's prescription, are shown mathematically to be impractical. Hodge argues that the sluice gates were raised in turn, leaving all the water to fill one pipe, with the other two left dry, thus instituting a system of water rationing by time. A special Pompeian feature is the secondary *castellae*, mounted on brick piers throughout the city to serve local needs when the mains supply was cut off. The author's analysis of water flow and the reconstruction of the sluice system, with its course and fine straining grilles, casts much new light on this aspect of Roman services construction.

ANNE HOLDEN, **A Brief Description of the Life and Work of Frederic Chancellor 1825-1918,** *Essex Archaeology and History* 26 (1995), pp.205-21. Frederic Chancellor was a university-educated, successful and prosperous Chelmsford architect with a varied workload that was as prolific as that of many better known Victorian leaders of the profession, but who only ever enjoyed a largely local reputation. Locally, however, he could have boasted that he was head of the civil, military and ecclesiastical life of Chelmsford being Chairman of the Local Board, Commandant of the Volunteers, and Churchwarden of the Parish in addition to numerous other local offices. Chancellor was also a founder member and later President of the Essex Archaeological Society and frequent contributor to the Society's

Transactions. Anne Holden's detailed and beautifully illustrated professional biography had its origins in a postgraduate thesis in Conservation and is a welcome addition to the growing literature on "second division" architects (see also entries under Carne and Geraghty).

J. PATRICK GREENE, **An Archaeological Study of the 1830 Warehouse at Liverpool Road Station, Manchester,** *Industrial Archaeology Review* XVII, 2 (Spring 1995), pp. 117-28. The 1830 warehouse forms part of the Liverpool and Manchester Railway's terminus in Manchester and was built at astonishing speed: ninety days from acceptance of tender to roof (26 April to 24 July 1830). The opening ceremony was on 15 September. The research was embarked upon to inform conservation strategy and the conversion of the building to provide additional facilities for the Museum of Science and Industry. But the project has yielded valuable information on the various types of timbers used in different parts of the framed building and on the unusual marks on many of the pine timbers. These were not the common Roman numerals employed as builders' assembly marks. They often consisted of a string of characters cut up to three millimetres into the timber, and sometimes extending for a metre (the longest comprising 21 characters, the average 8). These are identified as the marks used by quality controllers and merchants in the Baltic timber export ports, and by shippers at the British end of this essential supply route for construction timber. Further deciphering work remains to be done to open what author rightly describes as a powerful source of information on trade, economics, construction and even the possible dating of buildings.

B. S. J. ISSERLIN, R. E. JONES, S. PAPAMARINOPOULOS and J. UREN, **The Canal of Xerxes on the Mount Athos Peninsula: Preliminary Investigations,** *The Annual of the British School at Athens* 89 (1994), pp. 277-284. Ancient accounts of major engineering works are notoriously difficult to understand and to substantiate. This paper reports the use of modern geophysical survey equipment (the Sokkia Set 3 total station instrument) to chart the possible route of the canal which, according to Herodotus, was dug across the narrow point of the Mount Athos peninsula in northern Greece by king Xerxes of Persia, to ensure the safe progress of the fleet supporting his army of invasion in 480 BC. The traditional route for the canal is marked by a series of ponds, a "natural" cutting and a filled lagoon. A cutting of just over 2 kilometres through land rising some 15 metres above present day sea level was implied, if the canal had indeed been able to float ships from coast to coast (rather than a combination of floatation and slip-way which is suggested by some other ancient sources). The results at Athos were inconclusive, but much longer ancient water-filled canals are well attested, notably the pre-Ptolemaic canal linking the Nile and the Red Sea.

PAUL R. JOSEPHSON. **"Projects of the Century" in Soviet History: Large Scale Technologies from Lenin to Gorbachev,** *Technology and Culture* 36, 3 (July 1995), pp. 519-559. The Soviet Union embraced large-scale technologies with an energy that belied its economic backwardness. Its leaders saw technology as a means to convert a largely agrarian, peasant society into a well-oiled machine of workers dedicated to the construction of communisim. Lenin's electrification programme, Stalin's canals and hydropower stations, Krushkev's atomic energy and Brezhnev's Siberian river diversion scheme became the "hero projects" of the century. This article examines the evolution of the ideas underpinning large-scale Soviety technology, contrasting the official doctrinal commitment to major projects with the social and local factors that all too often frustrated the achievement of norms or yielded a legacy of technical failure and environmental disasters now confronting the new democracies. Of particular interest to readers of this journal will

be the sections on Soviet attitudes toward multi-storey buildings ("characteristic ... of Russian national architecture with its beauty and aspiration upward ..."), heavy panel construction for flats, and Akademgorodok, the Siberian City of Science.

LYNNE C. LANCASTER, **The Brick Linings on Vaults at Trajan's Markets: Some Evidence for the Organisation of the Building Industry in Rome**, *American Journal of Archaeology* 99, 2 (April 1995), pp. 317-8 reports a paper to the 96th annual meeting which introduces some new evidence on the possible contractual arrangements for large public sector building projects in Imperial Rome. The use of brick linings under concrete vaults occurs in two groups of rooms at Trajan's Markets. Examination of other buildings in Rome and Ostia indicates that the use of this technique was not standard, but appears to have been left to the discretion of the builder. Other evidence at Trajan's Markets, such a the location of building joints and changes in the level of bonding courses, suggests that the technique can be associated with a particular crew of workmen at the Markets. Inscriptions and legal evidence shows that private contractors were commonly used for public works; thus, each of the two brick-lined groups of rooms at the Market could represent the work of a single contract (and possibly the same contractor). Since the two sectors occur at different levels, this evidence suggests that large public building construction could have been managed by letting out relatively small, single storey sectors of the building to different contractors.

MARTIN MEADE and ANDREW SAINT, **The Marquis de Chabannes, Pioneer of Central Heating and Inventor,** *Transactions of the Newcomen Society* 66 (1994-95), pp. 193-213. Jean-Frédérique de Chabannes (1762-1836) came from an ancient aristocratic and military line. Aged 18 years he served briefly as a captain in America in the closing stages of the War of Independence. Later, during a period of peace, he visited England but – despite his contacts with English-speaking culture and libertarian leanings – threw in his lot with the Royalists during the early stages of the Revolutionary Wars and found himself in exile and safety in England by 1794 where (between returns to France and a final bout of soldiering in 1815) he involved himself in the heating experiments pioneered by Buffon and Rumford. His own initial contribution was in fuel economy by means of coal "cakes" (small coal particles combined with clay, tan and sawdust to achieve slower but more complete combustion). Later he worked on carriage suspension systems, before returning to the development of a mixed system of hot-air and steam heating and "a gamut of innovative fireplaces and a battery of Rumfordian domestic devices" for an innovative iron-framed residential block. After various economic setbacks he obtained and executed contracts for the heating and ventilating of a number of shops, theatres, hospitals and the House of Commons in the years 1815-19 before his commercial imprudence, instability and insatiable politicking sent him once more into obscurity. Chabannes provides a substantial footnote to the early history of building services.

JANE MORLEY, **"Acts of God": The Symbolic and Technical Significance of Foundation Failures**, *Journal of Performance of Constructed Facilities* 10, 1 (February 1996), pp. 23-31. During the last century, our perspective on foundation failures has changed profoundly. No longer are they seen as "acts of God", but rather as opportunities for investigation and analysis. Failure investigation and analysis has become a hallmark of the geotechnical engineering profession as a way to verify geotechnical knowledge and theory. This paper examines two frequently investigated failures, the Leaning Tower of Pisa and the Transcona Grain Elevator, in order to ascertain why these

case studies have been important in a technical sense to the profession. The second half of the paper examines how historical and traditional cultures have symbolically interpreted foundation failures in the structures they have built, and how they have tried to prevent these failures by developing and implementing various ritual practices, especially *feng shui*. Some anthropologists argue that people perform such rituals because they want to feel that they have some control over their environment; others argue that the only thing empowered by the ritual is the person or groups who control the ritual.

E. TOBY MORRIS, R. GARY BLACK and STEPHEN O. TOBRINER, **Report on the Application of Finite Element Analysis to Historic Structures**, *Journal of the Society of Architectural Historians* 54, 3 (September 1995), pp.336-47. Finite Element Analysis (FEA) is a computer-aided engineering analytical technique now available to historians interested in understanding the structural logic and behaviour of buildings and their component parts. The case study presented in this paper combines historical research and FEA to explore the performance of one of the greatest medieval heavy timber structures, Hugh Herland's roof trusses at Westminster Hall (1395-96), and to assess the structural contribution of their prevalent and highly ornamental tracery. Westminster combines two hitherto separate roof prototypes – the hammerbeam and the arch-brace-and-collar roof – to create a structure spanning one-and-a-half times the distance of any previous timber roof. How does the truss carry its loads and with what intent were its ornamental features employed? The complexity of this analysis, previously unsolvable with the tools available to historians and engineers, provides an excellent opportunity to demonstrate the capacity of FEA, working in concert with historical research, to clarify structural issues and reveal insights into the construction, longevity, and possible origins of historic structural types. At Westminster Hall it is found that the tracery in Herland's trusses reduced bending stresses in the principal members and, as a secondary structural system, was responsible for maintaining the structural integrity of the roof over time. These non-aesthetic functions may well have been understood by the designer.

DIETRICH NEUMANN, **"The Century's Triumph in Lighting": the Luxfer Prism Companies and their contribution to early modern architecture**, *Journal of the Society of Architectural Historians* 54, 1 (March 1995), pp. 24-53. Prismatic glass, which was a highly successful building material in the United States before the turn of the century and into the 1920s, promised to refract daylight from the facades deep into a building, thus helping to save energy, create healthier working environments, and contribute to the development of a new modern architecture. The Luxfer Prism Companies were the inventors and most prominent producers of this material; Bruno Taut's 1914 Glass House exhibition pavilion was probably its most celebrated application. The article examines selected examples of the firms' commissions in the US and abroad to show the influence that both a product's real or assumed qualities and the promoting skills of its producers could have on the formal and structural decisions of architects. The projects present the architect less as the dominating force in the design process than as a participant in a complex dialogue among different partners. Luxfer contributed to the contemporary architectural debate by promoting the small-scale pattern of its glass installations as a competing of architectural modernity that of the emerging aesthetic of steel and glass facades. In the early 1930s, however, prismatic glass finally lost the competition with electric lighting and new structural daylighting devices such as hollow glass blocks.

BERT SCHNEIDERS, **The Myth of Environmental Management: The Corps, the Missouri River, and the Channeliszation Project**, *Agricultural History* 70, 2 (Spring 1996), pp. 337-350. Between 1927 and 1969 the US Army Corps of Engineers transformed the Missouri River. From a slow, meandering, silt-laden stream with islands, sandbars, side channels and oxbow lakes, "Old Muddy" became a fast, clear, uniform stream with a central navigable channel for barge traffic to Sioux City. But the pilings, dikes, stone revetments and wing-dams forcing the water through the navigable channel prevented expansion, causing massive flooding from 1943 and prompting an additional construction programme for five of the world's largest earth dams in the upper river to capture the Spring floods (and, incidentally, to provide hydro-electric power and irrigation). The lowering of the river-bed in the navigable section below Sioux City, however, drained many of Iowa's lakes and wells, underlining once again the environmental consequences of many large-scale engineering interventions.

BRUCE E. SEELY, **SHOT, the History of Technology, and Engineering Education**, *Technology and Culture* 36, 4 (October 1995), pp. 739-772. For much of this century the curricula of American engineering schools have been torn between different educational priorities. No sooner had the initial battles been won to distance academic education from the trade schools of the nineteenth-century, than the university-based profession found itself torn between the rival claims of fundamental science ("physics envy", as someone called it) and the humanities courses which, it was hoped, would raise the social status of engineers vis-a-vis law and other established professions. The centrepiece of this paper is a study of the humanistic engineering programme adopted by the Case Institute of Technology in the 1950s with backing from the Carnegie Corporation, Ford Foundation and other bodies. The appointment at Case of Melvin Kranzberg, a historian from Amherst College, to teach Western Civilisation also provided the vital impetus for research into the history of technology and, with contributions from Carl Condit at Northwestern and John Rae at MIT, led to the foundation of the Society for the History of Technology. Seely is currently secretary of SHOT and his papers (see also Abstracts in *Construction History* vol. 9) are building an excellent alternative "historian's" view of engineering education.

JOSEPH SIRY, **Adler and Sullivan's Guaranty Building in Buffalo**, *Journal of the Society of Architectural Historians*, 55, 1 (March 1996), pp. 6-37. Plans for the Guaranty Building were finalised in November 1894 and the partnership of Adler and Sullivan was dissolved in July 1895. By then the effects of the 1893 slump had put a temporary brake on office developments of the kind which the partnership had developed so effectively. As the last of Adler and Sullivan's tall steel office buildings, the Guaranty responds in form and ornament not only to Sullivan's aesthetic programme, but also to functional and constructive demands of the type articulated by Adler. This article delves deeply into the different factors and ideas which shaped their last skyscraper. The accentuated verticality of the elevations exemplify ideas which Sullivan expressed shortly afterward in his celebrated essay, "The Tall Office Building Artistically Considered" (1896). These are traced back to the teachings of Hippolyte Taine, professor of aesthetics and history at the Ecole des Beaux Arts whose ideas Sullivan had studied. But constructional factors also played their part. The Guaranty's spatial and structural planning were based on a unit system of design, which also underlay the proportion of its street elevations and fenestration. The use of terra-cotta rather than brick may well have been prompted by labour conditions as much as by Sullivan's stylistic preferences. Very few bricks were used, and those purely as backing for areas of terra-cotta panels. The bricklayers were the most militant building workers' union in the 1880s and

1890s, and it is argued here that the opportunity presented by terra-cotta to minimise (or avoid altogether) bricklayers' work was a factor in the increasing popularity of the material.

IAIN STUART, **The History and Archaeology of the Hoffman Brick and Tile Company, Melbourne, Australia**, *Industrial Archaeology Review* XVII, 2 (Spring 1995), pp. 129-44. The Hoffman Brick and Tile Company of Melbourne was launched in 1870, pioneering the use of Hoffman Kilns and Bradley & Craven brick presses in Australia. Even in Europe, it should be said, this equipment represented state of the art manufacturing technology at the time. After a period of expansion from 1870 to 1890 the company entered a period of slow decline, culminating in its takeover in 1959. The site of the No. 2 Works in the Melbourne suburb of Brunswick is still used for making bricks and a recent survey revealed that much remains of the technology of the 1880s. The survival of so much that is old is attributed to the company's failure to modernise. The article itself – as its title indicates – is a combination of industrial archaeology, history of technology, and business history; a combination which gives a good overview of the factors involved in the production of the wide variety of clay products used in building construction over the last century.

RABUN TAYLOR, **A Literary and Structural Analysis of the First Dome on Justinian's Hagia Sophia, Constantinople**, *Journal of the Society of Architectural Historians* 55, 1 (March 1996), pp. 66-78. The Emperor Justinian's Hagia Sophia was completed in 537, but the dome only lasted just over twenty years until a series of earthquakes in 557 led to the collapse of the eastern main arch in 558 and, with it, most of the dome. The heavily studied replacement dome consecrated in 563 was clearly more stable but did not strike contemporary admirers with quite as much amazement as had its predecessor. The form of the first spectacular dome has for many years attracted the interest of scholars and this fascination shows no sign of decline. Rabun Taylor's paper reviews the recent research by Rowland Mainstone, Kenneth Conant, Robert Mark, and Swan and Äakmak and sets this beside a careful reading of contemporary Byzantine descriptions, chiefly those of Malalas and Procopius, to conclude that the original somewhat shallower dome was set on a fenestrated drum (as opposed to the surviving higher dome which incorporates a ring of windows in its lower levels). There is clearly still more to be learnt by structural historians from one of the greatest of ancient buildings.

BLAKE TYSON, **Rebuilding the Medieval Court-House at Keswick in 1571**, *Transactions of the Cumberland and Westmorland Antiquarian and Archaeological Society XLV (1995), pp.119-35. According to Robert Titler (Architecture and Power: The Town Hall and the English Urban Community 1500-1640*, 1993) only some 25% of the town-halls, moot-halls, court-houses and market-halls built in the sixteenth- and early seventeenth-centuries have survived, making it difficult to balance recorded costs with actual building works. Blake Tyson's article deals with one of the missing 75%, but Keswick's 1571 building (which was replaced in 1813) is particularly well-recorded by documents giving both detailed costs and sufficient clues to the form of the building for a tentative reconstruction. Neither expensive nor, it seems, particularly elegant, Keswick's municipal building nevertheless contributes greatly to our knowledge of the realities of sixteenth-century provincial public construction.

JO THOMAS, **The Building Stones of Dorset, Part III. Inferior Oolite, Forest Marble, Combrash and Corallian Limestones**, *Proceedings of the Dorset Natural History and*

Archaeological Society 116 (1994), pp.61-70. The first two parts of this series (see *Construction History* Vol.11) have been concerned with the use of the Upper Greensand chart and the Lower, Middle and Upper Lias limestones. The parishes studied in detail have been those parts of West Dorset underlain by Jurassic rocks. This part moves eastward and, like Parts I and II, provides a general discussion of the geology with parish or parish-group maps on which are marked the quarries or brickfields. Gazetteers give the National Grid references and local names for the quarries, together with notes on the types of stone extracted at different times and their use in local buildings.

ROGER B. ULRICH, ***Contignatio*, Vitruvius, and the Campanian Builder**, *American Journal of Archaeology* 100, 1 (January 1996), pp. 137-51. So much emphasis has been given to the concrete vaulting technology of baths and other major civic structures in Imperial Rome that the structural techniques employed in less prominent buildings have been largely ignored Yet most Roman commercial or residential multi-storied buildings required structural wooden beams for the floors, ceilings and roofs. In the seventh book of *De Architectura*, Vitruvius describes how floors framed in wood, known as contignationes, were to be constructed. According to the same author the wooden beams and planking of the *contignatio* could support a thick concrete sub-floor and top pavement. Deflection or settlement of any kind thus assumed a major significance because even minor distortions could crack decorated pavements or painted plaster ceilings. An examination of the traces of mezzanine floors from *tabernae* (shops) at Pompei, Herculaneum, and Ostia allow an assessment of the Roman builder's knowledge of the safe loading characteristics of structural wooden beams and the degree to which sawn lumber and its use were standardised among contractors working in central Italy. The differences in the techniques of construction observed in Campania and Ostia reflect a less wasteful use of heavy stress-grade timbers during the High Empire.

TADANAO YAMAMOTO and WALTER EDWARDS, **Early Buddhist Temples in Japan: Roof-tile Manufacture and the Social Basis of Temple Construction**, *World Archaeology* 27, 2 (October 1995), pp. 336-53. Buddhism was introduced into Japan from Korea in AD 538. Although some earlier buildings to house Buddhist images were probably erected, the first temple compound to be recorded archaeologically was started at Asakudera in 588. Asakudera marked the beginning of a temple-building boom. By 624 more than twenty had been erected in the central Kinai district, their construction sponsored initially by the leading aristocratic clans. By the year 692 there were 548 Buddhist temples nationwide. The temple at Kudarataiji (639) was the first of a growing number of late seventh-century temples sponsored directly by the Emperor as an important feature of increasingly centralised rule. The late sixth- and seventh-century temple construction programme in its early phases employed immigrant builders who imposed on Japan what was for that country an essentially novel building form featuring heavy tiled roofs, supported by massive timber pillars, resting on base stones and set into a podium of hard-packed earth which was faced with hewn stone. A distinctive feature of the new temples was a row of decorated circular tiles fixed along the eaves, and the authors of this paper have made ingenious use of modifications in the design of the eaves- tiles, small faults and blemishes in the moulds, and the occurence of the tiles from the same moulds on different buildings to chart the chronology of the construction campaign, and the employment of different groups of artisans working for aristocratic and imperial patrons.