

active period, down to the depression of 1905-10, when there was almost total collapse in the face of Scandinavian competition."

Franklin Toker, 'Gothic Architecture by Remote Control: An illustrated building contract of 1340', *Art Bulletin*, 67 (1985), pp.67-95. "Architecture is the only visual art that cannot be executed by the form-giver alone: it invariably demands the assistance of other executants. The contemporary architect goes one step further and executes buildings entirely by remote control. The beginnings of architecture by remote control are usually linked to the development of the working drawing in the Renaissance. This paper examines the drawing and text of a Siense building contract of 1340, and concludes that execution by remote control was already a significant part of the culture of Gothic architects." Toker's article concerns drawings for the Sansedoni Palace, preserved in the archive of the Monte dei Paschi di Siena, current owners of the palace. It goes a good deal further, however, to discuss building industry terms and titles and the pattern of administration in medieval building operations.

Theodore Turak, 'Remembrances of the Home Insurance Building', *Journal of the Society of Architectural Historians*, 44 (1985), pp.60-65. The years 1984 and 1985 are the centennial of one of the 19th century's most significant structures, the Home Insurance Building in Chicago, hailed by some as the world's first true skyscraper. Further light is shed on the circumstances surrounding the building's design and construction by documents from the architect, William Le Baron Jenney, his partner William Mundie, the fireproofing contractor Peter Wright and one of Jenney's competitors for the commission, Frederick Bauman.

Herman Van der Wee, review of W.H. Vroom, *De financiering van de kathedraalbouw in der middeleeuwen, in het bijzonder van de dom van Utrecht* (Maarsse, 1981) in *Journal of the Society of Architectural Historians*, 43 (1984), pp.267-8. "During the last few years medieval construction has not only been

studied from a formalist point of view but has also been analyzed systematically in its social, economic, technical, and even financial aspects. While the influence of finance on construction has been explored in the context of Italian cities in the Renaissance, similar systematic studies of Europe north of the Alps during the late Middle Ages have been undertaken less frequently. Mr Vroom's study is a happy exception. The book is divided into two parts. In the first part the sources of income for cathedral construction north of the Alps, in general, are thoroughly analyzed, and in the second part the financing of one particular project, Utrecht cathedral, is studied in detail." This lengthy review contains a good deal of information.

J.W.R. Whitehand and S.M. Whitehand, 'The study of physical change in town centres: research procedures and types of change.' *Transactions of the Institute of British Geographers*, New Series 8 (1983), pp.483-507; J.W.R. Whitehand and S.M. Whitehand, 'The Physical Fabric of Town Centres: the Agents of Change', *ibid*, 9 (1984), pp.231-47; J.W.R. Whitehand, 'Commercial Townscapes in the Making', *Journal of Historical Geography*, 10 (1984), pp.174-200; J.W.R. Whitehand, 'Architecture and Commercial Redevelopment in Post-War Britain', *Journal of Cultural Geography*, 4 (1984), pp.41-55. The four papers listed above report different aspects of recent research, carried out at the University of Birmingham's Department of Geography, on the physical development of British town centres since World War I. A county town, Northampton, and a suburban town, Watford, were the focus of the study, which made use of data from the local authority building applications to analyse the pattern of change in new buildings, additions and alterations; the agents of change (developers, professional consultants, contractors) and their location; the involvement of different types of commercial clients (large-scale retail chain stores in the 1930s, property and insurance companies from the mid-1950s); and the predominant architectural styles adopted at different times during the period.

Book Reviews

The Building of London from the Conquest to the Great Fire John Schofield

British Museum Publications, 1984,
x+190pp, 147 illust, £12.95
ISBN 0-7141-8053-X

Medieval and Tudor London was for a long time an enigma. Much of the street pattern survived into the days of accurate mapping, but the buildings of the period which can still be seen above ground, except in Westminster, amount to hardly more than a few churches, plus the Tower, the shell of the Guildhall and parts of the legal Inns. Even the one major domestic survival in the City, Crosby Hall, was horrendously demolished in 1907, and transported for re-erection to Chelsea. People could only suppose that the pre-Fire City looked something like parts of York, Canterbury or Shrewsbury.

John Schofield, who is a field officer at the Museum of London, has written a book which is both intensely factual and pleasantly readable, and helps to place London firmly in the stream of building history. By drawing on both archaeological and documentary evidence, together with recorded impressions from the past, both visual and written, he has produced the most comprehensive general history of early London building that has yet appeared – following, in less detail, the example of Martin Biddle and Derek Keene in Winchester and Colin Platt in Southampton.

We are reminded of the dangers of studying architectural history only on the evidence of buildings that survive. It is true that the significance of the St. Paul's Chapter House and St. Stephen's Chapel in Westminster in the evolution of the Perpendicular style is now fully appreciated, but how often are the Norman nave of St. Paul's, drawn by Hollar, or the remains of Holy Trinity Priory, Aldgate, depicted in a drawing of 1800, properly related to, say, Ely or Norwich?

Perhaps the greatest value of the book is the light it sheds on the history of domestic building. Some splendid undercrofts are known from drawings, such as Earl de Warenne's reputed house in Southwark, demolished in 1830, and Gerrard's Hall off Cannon Street, destroyed in 1852. Others have been revealed through excavation, as at Milk Street, and one, at 8 Philpot Lane, was discovered by a delegation from preservation societies, including the reviewer, when that building was threatened. Interestingly there is evidence that some of the early undercrofts – like the extant one at St. Mary-le-Bow Church – were at first above the levels of the surrounding streets, which have been raised since.

As elsewhere in England some merchant's houses were built of stone around 1200, but after that they were mostly timber-framed, though often with stone undercrofts and stone party walls (controlled by regulations). Ragstone from the Medway Valley was used for basic structural work, with Reigate stone for dressings and details. Stone from Caen, Beer (Devon), the Isles of Wight and Purbeck, and Oxfordshire was used for important buildings but Portland stone was used only occasionally. Imported Flemish bricks and tiles were used, especially for chimneys, from the fourteenth century but, as elsewhere in eastern England, bricks came into widespread use only towards 1500. Overwhelmingly, oak was the dominant domestic building material, varied by elm for certain features and, even in the Middle Ages, by Baltic deal for planks.

Many of the houses followed the courtyard plan, as did early livery company halls which often originated as merchant's houses. The actual street frontages were frequently developed with speculative houses and shops, perhaps one room deep, three to four storeys high and sometimes physically backing on to the courtyard buildings. Surveys by Ralph Treswell of Clothworkers' Company proper-

ties in the early seventeenth century, including ground plans and descriptions of upper floors, illustrate this well. More typical long and narrow plots developed in different ways; the original gardens were often infilled with cottages or workshops, resulting in the establishment of public alleyways to give access to the backlands. Evidence of this type of layout, fossilised amid later rebuilding, survives in an ever diminishing quantity in the City to-day.

Drawings and engravings, especially those of J.T. Smith in the 1790s, and some early photographs, illustrate what a rich field there is for studying the now vanished timber-framed houses in those parts of London which escaped the Fire, such as Smithfield, Aldgate and (though Schofield does not cite any examples here) Aldwych. There were dozens of sixteenth and seventeenth century houses rising to four or even five storeys, jettied and gabled, the later ones often with naive Renaissance motifs; none were substantially different, apart from their greater height, from those which survive in places such as Shrewsbury, Chester and Bristol.

There are plenty of illustrations to the book but the captions could be longer. They sometimes include attributions as if they were definite when they are only probable – the adjoining text being left to make the necessary qualifications. 'All Hallows Barking' is a confusing, though correct, name for All Hallows by the Tower which might lead readers to suppose that the church is in Barking. The site in Southwark to which St. Thomas's Hospital moved after 1215 is not its present site. These last comments are mostly trivial: the book is one of the most important on urban building history to have come out for a long time.

David Lloyd

The Technology of Historic American Buildings: Studies of the Materials, Craft Processes, and the Mechanization of Building Construction

H Ward Jandl (ed.)

Association for Preservation Technology, 1983, 224pp illus. \$25
ISBN 0 92 476 07 4

American historians have a relatively strong record in studying building technology and construction. Their work rightly deals with the pace of innovations in the use of materials and in the emergence of large contracting firms that were instrumental in the development of steel construction and the skyscraper. Studies have been further encouraged by the greater attention given, both by contemporary critics and by historians, to commercial building types where questions of structure and the provision of services are of central importance to the design. However, research by writers such as Carl Condit has traditionally tended to emphasise the historical path towards modern architecture, rather than reflect the diverse ways in which materials and processes were also adopted to achieve other ends, whether economy, prefabrication or cheap decoration.

There is some diversity in the approaches taken by the contributors to this volume in studying the manufacture and use of various materials and products. The best of the essays succeed in linking questions of technology, economics and design. Paul Sprague describes how a type of timber prefabrication, the balloon frame, was developed by George Washington Snow during the 1830s. First introduced in Chicago, his system revolutionized timber construction in America, spawning a range of variants including the use of all-nail jointing and, on the West Coast, the use of units only one storey high.

Examining a material with an obviously decorative as well as practical function, Mary

Dierickx contributes an excellent study of the manufacture, marketing and use of decorative metal roofing. These individual tiles or sheets were made in copper, zinc and iron, the latter often being protected by tin or galvanising. Metal roofing was very popular in the south and west from the 1880s until the Great Depression. It was sold primarily by mail order to the building owner or handyman. One firm advised their agents 'to avoid using big words' in presenting Hamsley's patent tin shingles to clients.

A paper by Pamela Hawkes on the tools and techniques used in exterior painting in the nineteenth century also shows a strong awareness of commercial practicalities. It provides a useful introduction to the variety of oil paints and white washes and a range of decorative effects that could be achieved by sanding, marbling or graining. However, there is a danger in writing almost in the form of a manual of materials and processes, in that historical developments tend to become blurred rather than highlighted. The contribution on architectural terracotta concentrates on unravelling the drawn-out stages of manufacture, without emphasizing adequately that the techniques described apply most directly to the early twentieth century. But Robert Mack does make good use of a series of working drawings and photographs from the archives of the American Terra Cotta Company to illustrate the evolution of designs from the architect to the draughtsman's office and the plasterer's workshop, and finally to the finished building.

The three other studies examine detailed aspects of the use of iron in architecture. Charles Peterson takes an international look at the development of the I-Beam. Developments in iron making in England, France and the United States are presented as leading into the evolution of the wrought iron beam on the east coast of America. Both this paper and the following contribution on cast-iron facades by Antoinette Lee tend to extol the merit of iron without acknowledging the concern that iron was in fact a serious fire hazard, if not clad with a fire-proof material such as tile or concrete.

The first paper in the book is essentially a collection of notes on hand-forged iron hardware dating from the eighteenth and early nineteenth centuries. Donald Streeter describes various locks, latches, bolts and boot scrapers in detail and many are credited with having been exported from England. His approach follows that widely adopted by American museum curators in examining the form of muskets, sewing machines or clocks to discern the emergence of mass production techniques. It could be a valuable methodology for studying building components but the author does not succeed in developing many conclusions as to the links between eighteenth century iron-making in Europe and the market for hardware in the colonies.

This volume demonstrates the range and vitality of interest in American building technology. It also contains much material that should inspire comparable studies in Britain. However there are further lessons that might be drawn from the rather fragmented nature of these papers. The study of construction history does need to have a coherence or at least a list of major themes and questions if it is not to develop as simply a collective heading for individual studies of various materials, types of building and patent systems of construction.

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French Iron Architecture

H. Steiner

UMI Research Press, 1984, 290pp.
illust, £45.25
ISBN 0 8357 1544 2

This book traces the relationship of iron to architecture in France from pioneers like Ango and Victor Louis in the late eighteenth century to a climax at the exhibition of 1889 (the Eiffel Tower and the record 114 metre span of the Galerie des Machines). It does this by a route studded with numerous and diverse examples, some familiar, like the Chocolat Menier factory, Les Halles or Bon Marché, and others intriguing revelations.

The impact of iron on architectural thinking in France comes over as greater than in Britain, its use appealing to the rational side of the French character. A desire to 'express the structure' and the attendant belief in honesty to materials seem to have been present in France long before they became fashionable elsewhere. For instance Viollet-le-Duc, whom most people associate only with medieval restoration, was complaining in the 1860s of the moral degeneration of architecture due to the disguising of true materials with parasitical ornamentation. Viollet-le-Duc is shown as one of the great champions of iron.

While intellectually structural iron may have been more widely accepted in France than in Britain, its visual impact was restricted until towards the end of the nineteenth century by building codes requiring external walls to be at least half a metre thick. Nevertheless it seems clear that in the interiors of major French buildings in the mid and late nineteenth century there were more iron floors, roofs and columns than in the equivalents here. The iron was not always expressed visually and in practice the breadth of its influence on architecture remains unclear.

Even if the author does not wholly establish a logical architectural progression — probably there wasn't one — she takes us on a wonderful journey through her examples. Reynaud's tall wrought-iron lighthouses built in the 1860s and some of the alternative proposals for the railway stations and numerous exhibition buildings are virtually unknown in Britain. What is more, these examples are generally well documented with dates, critical dimensions and the names of the architects and engineers. Above all there are references in plenty (mostly to contemporary French sources), for this is a scholarly work, with 21 pages of notes and references and a 10 page bibliography.

In spite of its title this is really more a book on building structures than on architecture. As such, more line diagrams would have been helpful, however simple, even at the expense of some of the plates. It is often hard to

visualise the structural form from the text and there are many more buildings described than illustrated.

More than anything else this book emphasises the insularity of the history of engineering. Writers on the subject in Britain tend to concentrate on developments at home with only short glances at what was happening elsewhere and with a chauvinism which is often as strong as it is unconscious. The same is generally true in the U.S.A. and can be expected elsewhere. There are also barriers of language and of availability, which apply in all directions. Anyone who crosses such barriers should be welcomed.

Frances Steiner is clearly a Francophile and her knowledge of what was happening in Britain (and America?) appears to be limited. This is shown by some errors of fact in relation to construction in Britain and by attributions which may be disputed. In spite of these she has not only opened a door to what for many must be a new world but she has provided a detailed gazetteer to what lies beyond.

Perhaps the greatest weakness in this book lies in the author's imperfect understanding of the structures she is writing about. This may be attributable to her discipline (art and architectural history) and it may only worry engineer readers. If this was just a coffee-table book concentrating on visual images one would not expect structural erudition, but it is a much more serious study and when it does discuss engineering the results often just miss being convincing.

It is particularly sad that there is no real attempt to compare the development of the structural frame in France with that in Chicago and elsewhere. Once you start discussing wind loads on multi-storey buildings and the elimination of the masonry wall you need to go on to consider the evolution of bracing and the way the whole concept of stability changed.

In spite of some aspects which may be criticised, this book has much to recommend it. It should be required reading for anyone seriously interested in the history of construction. Above all it is an excellent source book.

Now we want the international analysis of its contents.

R.J.M. Sutherland

Victorian Building Regulations Summary tables of the principal English Building Acts and Model Bye-laws 1840-1914

Roger H. Harper

Mansell, 1985, xxxvii + 137 pp. £20
ISBN 0 7201 1751 8

Dr. Harper has provided an invaluable work of reference for building historians and has highlighted the impact of controls and regulations on both design and construction. This book centres on the analytical tables which chart in detail the development of bye-laws. In these Harper separates out the regulations into common categories, such as 'space about buildings', 'structure', and 'drainage', and through this organisation provides a system of cross-referencing between different acts and sets of by-laws. These tables include technical diagrams from the original schedules and identify innovations in technique and construction which in turn called for new controls and constraints. This tabular presentation is placed in context with an introductory essay which describes the evolution of the English building regulations and discusses the influences on their development and disbursement. Harper also provides a useful glossary of technical terminology, along with a reasonably comprehensive bibliography.

The main problem with a book of this nature is inevitably that of selectivity, for of course Harper cannot include all building acts of the period. Alongside the major pieces of national legislation he concentrates on the metropolitan building acts and makes a somewhat arbitrary selection from a small number of provincial acts. While it would be intolerably tedious to include all sets of building bye-laws, nevertheless anyone using this book as a source of reference must be

aware of this limitation and should be alerted to the bias which the selection produces. Both the timing of the production of codes of bye-laws in different provincial towns and the individual aspects of the regulations had considerable impact on the character of building and the nature of urban growth in that locality. While national acts and model codes set certain standards of good practice, it would be misleading to extrapolate from these either a standard or a practice that was generally applicable. Not least, there is no reflection here of the very limited impact throughout the nineteenth century of building bye-laws in non-urban England.

In his brief introduction Harper does not do justice to the conflict that continued throughout the period under consideration between promoters of national building acts and advocates of local regulations. Building bye-laws as they developed in the nineteenth century were a pragmatic recognition of the political necessity of balancing local prejudices and interests against the advantages of nationally determined and maintained controls. The national acts and their resulting model bye-laws, which Harper analyses in detail, set standards and served to elevate local opinion. What fails to come over in this survey is the extent to which, with power shared between central and local government, bye-laws could at one level be standardised as though they were national regulations, and yet at the same time be flexible enough to cater for local traditions and variations.

To this end it would be useful to have a checklist of building regulations by date and place. But that is another task. Harper has provided most usefully a set of analytical tables which show how requirements and regulations developed. Though there are some minor mistakes in the cross-referencing, this presentation is nonetheless a useful means of tracing ideas and their application. It also provides a valuable source of comparison for anyone examining other codes of building regulations

In essence, however, this is a reference work. The impact and import of the regula-

tions presented are not in turn assessed. The effectiveness of enforcement, as well as the significance of regulations in terms of style, stability and sanitation, are topics that should engage the historian of construction. Harper has practically provided the basis for such study, but most importantly he has made accessible the study of Victorian building regulations made so difficult by their sheer quantity and complexity.

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The Dream of the Factory-Made House Gilbert Herbert

MIT Press, 1984, 407pp. illust. £32.50
ISBN 0 262 08140 7

This is an account of how in the United States in the late 1940s Walter Gropius and Konrad Wachsmann devised an industrialised housing system, drawing on their various earlier experiences in Germany and France. Professor Herbert sets out to demonstrate that this was a practical – but, unhappily, disastrous – manifestation of a coherent development programme which finds its theoretical roots from 1907 onwards in Gropius' work with Peter Behrens.

The book has four parts. The first is a summary review of the increasing dependence of the building industry upon manufactured components with the rise of industrialisation in the West in the nineteenth century, and how this found its way into the consciousness of practising architects. Herbert briefly but neatly relates this to the global economic interests of the major powers; it would be valuable to have more on this theme.

The second part is a meticulous description of Gropius' theoretical and empirical studies in prefabricated housing (predominantly with metal components), set in the context of German work (including Wachsmann's) in this field during the 1920s and early 1930s. It culminates in 'the saga of the Copper House'. The emphasis is on Gropius as a practising

architect and does not seek to link this with his teaching at the Bauhaus. This is the most powerful section of the book and adds significantly to our understanding of Gropius' view of the working relationships between designers and the building materials industry.

The next part is a diversion. It details with the flight of artists, designers and other intellectuals from Nazi Germany, giving special attention to the Jews. It includes an interesting account of how certain German prefabricated houses were built in Palestine but adds little to the central thesis except to inform us that Bauhaus principles reached West Asia early on.

The last part sees the coming together of Gropius and Wachsmann and their collaboration in the U.S.A.. Towards the end of the War they devised a series of proposals for prefabricated housing, with their hopes eventually concentrating on the 'Packaged House' of the General Panel Corporation. The system failed to find a market and Herbert provides a poignant elegy by comparing its misadventure with the wholly successful emergence in the U.S.A. of the mobile home industry. This final section presents worthwhile new material but lacks the penetration of the earlier parts of the book. Moreover, it is not clear to what extent this U.S.A. experience is a valid test of Gropius' earlier theories.

Herbert's text is lucid, absorbing, thoroughly documented and has a wealth of pertinent illustrations (including many construction details and photographs of site assembly). He reports vividly but lacks a critical stance in three respects. First, with the exception of his discussion of Wachsmann's work, it is often unclear why successive prototype systems and/or their jointing details were preferred – i.e. in what sense one improved upon another. In this respect it is a little surprising to find no reference to contemporary work by Prouvé. Second, for an author with extensive knowledge of the evolution of the manufacturing base of the modern building industry, he is rather perfunctory in his analysis of off-site versus on-site factors in the design and

assembly of buildings. Third, he shows little interest in the economics of component production and their significance for a *programme* of building – a crucial issue, for instance, in his account of the General Panel Corporation. Perhaps his sympathies are to be found on page 66:

'The practical experiments of Gropius (in Germany) were more limited than the grand sweep of his theoretical vision ... At all times, however, through the reiteration of his broad theoretical principles, Gropius kept the wider picture and the bigger dream in mind. At no time did he regard the technical solution as an end in itself. The same, however, could not be said of the pragmatic forces of industry.'

In this view, Gropius emerges almost as the Einstein of twentieth century architecture – an impression reinforced by the sections on Wachsmann's design for a house for Einstein at Potsdam and Einstein's subsequent kindness in return. Herbert is open in his admiration for Gropius' combination of broad vision, intellectual penetration, innovative theory and great personal generosity. He implicitly refutes the chauvinistic tones of Tom Wolfe's *From Bauhaus to our House* and other attempts to reduce Gropius to a technocrat. The central value of this slightly uneven but always informative book is that it substantially improves our understanding of Gropius and his contribution to architectural theory as a basis for practice.

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