

The significance of natural ventilation

Colin Porteous

The recovery of natural environments in architecture: Air, comfort and climate C. Alan Short BRI Book Series, Earthscan from Routledge, Abingdon, UK, 2017 ISBN 9781138651463

The author, Professor C. Alan Short, is one of the too few with an illustrious career in both architectural practice and research. This book can be considered as a monograph of his practice, or praxis, but it is also much more – a well-considered thesis of an abiding passion with air – the first word of his subtitle.

Part of this book tells the story of Short's quest through the medium of his research-based built work – what went right, what went wrong and all between. It also addresses the role of regulatory issues (e.g. potential fire spread) and how they can influence and stifle innovation and appropriate responses.

This book provides a deep historical grounding evinced in the thorough philosophical, climatic and built context on the underlying, complex cultural understandings of air and comfort. This provides a foundation for case studies, but is also evident in the aesthetics of the case studies themselves. It must be said in the latter regard that Short's buildings are not mainstream, and this is not simply due to his justifiable (in my view) mission supporting natural ventilation as far as possible, but also because Short wishes his buildings to function as reservoirs or instruments of remembrance as well as current landmarks that proffer a more benign future. At the end of his Introduction he situates his work as 'nonmodern'. 'Modern' is still, of course, a very architecturally loaded word, even well into the 21st century, its literal meaning simply implying of the 'now', but its architectural meaning is understood to imply a certain restraint or minimalism redolent of the inter-war period in the 20th century, often called the 'heroic period of modernism'. Here, the use of the generic noun

with its 'ism' conveys the particular, which represented an architectural design revolution in its day. The modern 'now' of today is more catholic as perceived in many guises.

In addressing his agenda, having delved rather interestingly into the contextual history of key issues for his overarching topic and, for example, early on mentioning the role of Max Joseph von Pettenkofer in terms of his 'portable apparatus' (e.g. measuring CO₂), Short deftly deals with two of his case studies. He includes his landmark Queen's Building in Leicester and the Lanchester Library in a more open site in Coventry; these are complemented by the more recent 2005–06 School of Slavonic and East European Studies (SSEES) building for University College London on a very confined, and very densely built-up 'urban heat-island', site in Bloomsbury, Central London. At the same time as addressing the transport of relatively large bodies of air by natural means, Short considers fire-safety requirements alongside thermal comfort and operational robustness. Sometimes this constitutes a story in itself, and does raise the question about the creation of a lightwell that is unoccupied by users. Effectively this is a vertical, transparent duct to enhance light and air for adjacent occupied spaces. The regulatory scheme for fire safety led to this solution. As noted above, the book devotes much space to performative issues – good, middling and bad. By this point, the reader is also aware of liberally spread illustrations – well over 80 (more than 300 altogether) – and at least some of the causes of 'bad' such as poor sealing at junctions. The scope of the illustrations throughout, from photographs to diagrams of one sort or another, including plans and sections with their technical aids, are for this book a 'tour de force', a huge benefit to readers in understanding how his, and other, buildings function, both theoretically and in reality. It is also worth emphasizing that the narration acting as 'captions' to some of these illustrations is far more direct and informative compared with remote notes, and legends are extremely thorough in the same way.

The reader is introduced to some quite novel techniques, such as 'passive downdraught cooling' (PDC) and the 'ventilating cornice' or 'breathing parapet'. Overall, there may be more

technical and numerical detail than is strictly required, especially for architects. But then this book is for all who are associated with the built environment, and the provision of detailed numerical data and analysis is good medicine for architects who tend to be too sheltered in this regard. Short's careful numerical analysis may also be seen as a metaphor for understanding people's involvement in a building's day-to-day control and workings.

Having looked at varying temperate climatic conditions in differing built contexts, the reader has to wait until considerably later in the text to learn how his practice fared with two other major projects. The first is an industrial building, a new masonry brewery reliant on passive, nocturnal cooling, in a fairly settled and specific Mediterranean climate on Malta, completed 1990. The second is more recent, returning to an educational campus, but in a quite unpredictable continental climate on a day-to-day as well as seasonal basis, in the central US. In the meantime, themes addressed in the book are not confined simply to thermal comfort, and his practice's completed case studies take a back seat to the more programmatic exploration of particular building types – theatres and hospitals. New-build and renovation of theatres coincides functionally with a key part of educational demand. Short's work on hospitals is currently theoretical and based on advanced modelling techniques. And although 'thermal comfort' as such may be partly in abeyance (to acoustics, for example), the movement of air and its control remains central to both types.

A strength of the book is its presentation of a fascinating history of the building science for different building typologies with some of its 19th-century illustrations reminiscent (for me) of many a lecture. It is worth quoting some of Short's succinct lines of thought: 'Should air be supplied from above or below in these densely occupied buildings? ... The upwards method was vindicated' (p. 161). One may note that this was a fundamental issue and a cause of the split between David Boswell Reid and Charles Barry in terms of the new Houses of Parliament building (pp. 18– 19); but it is the respective upward or downward thinking and actions of Reid and John Shaw Billings that Short more fully develops in the middle of his book. For example, still referring to Westminster (the

Methodist Central Hall, 1898–1912), Short refers to the attempt by Billings to ‘implement the “downward method” within the second largest concrete dome in the world’ (p. 168). And later in this paragraph, implying a tendency to the upward displacement methods of Reid, Short asks: ‘What empirically derived knowledge and understanding was being discarded?’ He also informs of the progressive development of ‘upwards’ to the ‘edge-in, centre out’ (centre as in top centre) principle via the Wiener Hofoper by Billings (1861–69), and to both the somewhat later Gaiety Theatre and the Lyric Theatre by Arthur Jules Morin (pp. 162–165). The topic also transfers with ease from theatres to hospitals, where proposals by Billings with Norton Folsom for the Johns Hopkins Hospital in Baltimore adhered to this principle, while later, Folsom tried the alternative ‘centre-in, edge-out’ solution. He also, relatively briefly, takes us through the ascendancy in the 20th century of what Dean Hawkes calls ‘exclusive’ environments; heavily reliant on air-conditioning systems, and dramatically cutting off occupied built interiors from their ambient natural environment.

Albeit in abeyance, Short’s work is woven adroitly into his narrative. The Queen’s Building in Leicester makes a return to explore particular aspects of naturally ventilating lecture theatres, and two Arts Council, Lottery-funded, regeneration projects are also included: the Contact Theatre in Manchester, with its exuberant array of multiple exhaust ‘chimneys’ and hidden BMS-controlled dampers, and the Garrick Theatre in Lichfield. When it comes to Short’s contribution to the design of new hospitals and how to ‘recover natural environments’, the included proposals remain theoretical, both in the historical chapter following on from theatres and in his penultimate treatise tackling a relatively new generation of hospitals and examining the potential for ‘adaptive’ opportunities.

When Short addresses Continental climates, his key case study, the Judson Academic Centre near Chicago, shows what versatility in approach is needed. This leads him to greater hybridization of passive and active principles in order to tackle climatic conditions that are both more extreme and hard to predict on a daily basis. This building forms a good sequel to the progress made at Lanchester and the SSEES. Judson, with its two main components – one square and one linear – is

possibly his most challenging project to date. This means that the carefully annotated plans and sections have to be assimilated with time and care; but it has to be said that some illustrations are on the small side with the printed word quite hard to read. Perhaps there is a general tendency for text on such drawings to fall victim to excessive visual miniaturization, especially for the more complex projects in environmental terms.

Overall, this is a superb book, as well as very unusual one. It is really rare to find a practising academic architect who is highly erudite and so steeped in culture and history, as well as in the technical matter of managing the largely passive movement of large amounts of air in an economic and environmentally acceptable manner in today's world.

The final chapter, *Delivering the 'recovery'*, is brief and resorts to bullet points, but the use of the gerund is optimistic and it is appropriate to be optimistic and assertive in this section. Even so, space is provided for some history, and central players such as Reid, Billings, Morin and Pettenkofer receive due mention. Short reminds us that some key 19th-century buildings were digitally modelled and subjected to rigorous modern 'analytical techniques' by his team, and, equally relevantly and presciently, he asks: 'What about the existing building stock?' If only those who look after our regulatory environment would take that question seriously, and if only adequate financial mechanisms (on the scale of highly dubious armaments 246 REVIEW in terms of need) were put in place to enact an adequate response, we might achieve something useful as a society. Short does ponder the issue of 'taste' in representing a major challenge to such a scenario, and one can think of the culture we now have engendered by lifestyle in which esoteric gadgetry plays a strong part. For example, the modern car (perhaps due to be weaned off direct use of fossil fuels in the not-too-distant future) represents a culturally ubiquitous and environmentally sinister acquisition. The same sort of individual encapsulation occurs via the realm of electronic sound, where, no matter how healthy the intrinsic activity, it is one of further deliberate isolation. Therefore, carrying this inside

the buildings we occupy denotes societal antipathy, whereas Short's buildings, which some may perceive as a 'blast from the past', actually represent a more hopeful and engaged future.

Colin Porteous, Mackintosh School of Architecture, Glasgow School of Art, Glasgow, UK
c.porteous@gsa.ac.uk