

In the introductory article to the series, Peter Blundell Jones discussed some of the difficulties in designing authenticity, and suggested that although absolute authenticity may be unobtainable, relative authenticity is still a useful concept. In this article he investigates tectonic authenticity — the notion of truth to materials, structure and construction.

In search of authenticity Part 2 Tectonic authenticity

We all know what it means to call a real brick wall more authentic than brick wallpaper on plasterboard. The trouble is that when it comes to building the real brick wall, it is difficult to obtain a hard and fast definition of what is the most appropriate use of the material. Even at a supposedly technical level, arguments continue about the virtues and vices of cavities, and about the relative advantages of different methods of bonding or pointing. For every designer, though, there is also the vital question of the 'feel' of the material. Louis Kahn spoke of 'asking a brick what it wants to be', but different designers seem to get rather different answers to this question. We will concern ourselves here only with some who use the material in demonstrative and arguably appropriate ways, but even so their attitudes frequently conflict.

Kahn's work stresses brick's massiveness, with huge areas very plainly treated and crisply edged, 2. He also dramatises its compressive as opposed to tensile strength, so arches are frequently in evidence, sometimes in partnership with reinforced concrete tension elements, set prominently like a string across a bow of the arch. Kahn's general concern with gravity, compression, and the problem of getting across openings is shared by many other architects using brick, especially those of the Arts and Crafts movement. At Philip Webb's Red House, for

example, nearly every window is capped not only by a segmental brick arch, but also by a pointed restraining arch in the wall above, 1. Sometimes, for example, on the stair tower, the window is recessed along with the panel between the two arches, defining a kind of tympanum. In very few cases could the double-arched arrangement be considered structurally necessary, though it might justly be called 'sound practice'. More precisely, it is an exaggeration of sound practice, more an expression of what the bricks want to be than how they have to be.

Sigurd Lewerentz's bricks, used in his late churches at Bjorkhagen and Klippan, have quite different wishes, 3,4. In a country where they are relatively scarce and expensive, he treats bricks as sacrosanct and inviolable: they are under no circumstance to be cut. This is not to be confused with the module mania of the same period, which sought to dimension everything in avoidance of cuts for mundane economic reasons. Lewerentz imposes no such discipline: indeed, he runs himself deliberately into the detailing problems involving headstands with mortaring technique, bulking out the mortar with slate to make the huge joints possible.

Unlike Kahn and Webb, Lewerentz shows scant respect for gravity. For although his main religious spaces demonstrate the

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compressive strength of brick in vaults, wall openings throughout St Peter's Klippan are crossed without visible means of support, stretcher-bond running through uninterrupted, the bricks apparently suspended in mid air. This was actually achieved through reinforcing bars laid in the joints, which Lewerentz was happy to conceal completely.² Evidently, it was important for him that the hole in the wall was treated the same way at the top as at the bottom to maintain the dramatic simplicity of his famous frameless window.

In contrast, Kahn's bricks are happy to be cut, at least where they meet the arch, Webb's too. A more extreme version of cutting in the latter's work is the use of rubbed bricks, with which Webb achieves the magnificent drawing room fireplace at Red House, 5. This masterpiece of the bricklayer's art was achieved by reshaping the bricks laboriously on almost every face, and making each different from the last, so the shape of the raw bricks and their repetitive nature — qualities celebrated by Kahn and Lewerentz — are completely lost. Later in the nineteenth century, bricks were made to turn odd corners through the incorporation of a great variety of specials. These allowed some very elegant and efficient details, but the forcing of clay into such moulds is clearly against the nature of brick as interpreted by Lewerentz or Kahn. Equally unacceptable to them would be the use of bricks spoiled or distorted in the kiln, yet precisely these are selected by the Expressionist Bernhard Hoetger³ for use in the most prominent places, 8, reminiscent of the biblical story about the stone rejected by the masons that became the headstone of the corner.

Rightness for the craftsman

Perhaps if bricks do speak, then the bricklayer is one of the most likely people to hear them. Most craftsmen and women develop a sense of what constitutes good workmanship — a genuine aesthetic sense, if a limited one — and if left to their own devices could perhaps evolve effective and elegant ways of putting things together.⁴ Many of the qualities of the old farm buildings now seen in open-air museums are due to the fact that designer and builder

are one and the same, working in a tradition established over centuries. Here, one admires not just the sheer quality of workmanship, but the way the materials are used in harmony with their particular natures, leaving them uninterchangeable, so wood could not do the job of stone or iron and vice versa. A decorative vocabulary is often discovered in elaboration of the craft process, raising it at appropriate moments to the level of play.

The old crafts allowed an intimacy with material that is impossible today. Writing only 70 years ago, George Sturt described a sensibility rare now even in memory:

'It was held a shame to have to do work twice over because the material had been faulty; and I have known old-fashioned workmen refuse to use likely looking timber because they held it to be unfit for the job. And they knew. The skilled workman was the final judge. Under the plane or under the axe timber disclosed qualities hardly to be found otherwise. My own eyes know because my own hands have felt, but I cannot teach an outsider, the difference between ash which is "tough as whipcord" and ash that "frow as a carrot", or "doaty", or "biscuity". In oak, in beech, these differences are equally plain, yet only to those who have been initiated by practical work. These know how 'green timber' does not look like properly dried timber, after planing. With axe or chisel or draw-shave, they learn to distinguish between the heart of plank and the sap. And again, after years of attention, timber users can tell what shakes are good and what bad.'⁵

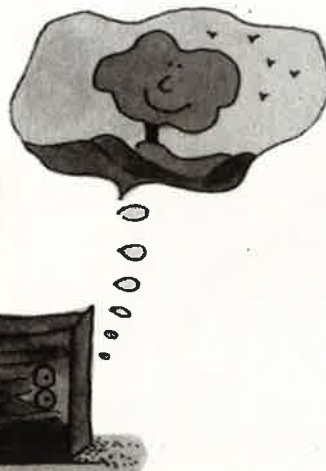
This sense of materials is largely lost in building today. The craftsman is hemmed in by design specialists, bureaucrats and others cut off from the raw materials by the intervention of the machine. Certainly new kinds of craft sensibility have developed, and a new kind of glittering precision visible in the best High-Tech work.⁶ But natural materials have generally been divorced from their origins in nature. Timber is despised for having knots, the legitimate memory of its branches, 6. It begins to forget it was a tree at all when its grain runs both ways in plywood, and it becomes quite homogeneous as MDF. Even when used in the natural state, it is immediately reduced to a state of flatness and



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1 Red House by Philip Webb: arches over windows are expressive of function rather than functional.

2 Louis Kahn's school of administration, Ahmedabad 1963: the design stresses brick's massiveness and its tensile as well as compressive strength.

3, 4 Sigurd Lewerentz's church at Klippan: bricks are treated as sacrosanct and are never cut, even when this causes distinct detailing problems and results in huge joints.

5 Drawing room fireplace at the Red House: a masterpiece of the bricklayer's traditional arts.

6 The nature of wood: a plank's dream from a children's illustrated book by Anna De Carlo.

7 Design against nature: MDF fittings at the Stirling Wilford Turner wing at the Tate Gallery.

8 Expressionist brick arch by Bernhard Hoetger.



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9 Owen William's Sports Hall at Wembley: the fin-like elements balance the portal frame; but their shape is a concession to the construction process.

10 Foster Associates' Hongkong and Shanghai Bank: structurally illogical for it takes loads up and then down again.

11 Maillart-designed bridge: an excellent solution to a problem, but not the only solution.

12 Giancarlo De Carlo-designed tower proposed for Siena.

13 Foster Associates' Stansted air terminal: a satisfactory solution in structural terms.



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consistency by the straight-edge and saw: gone completely are the days of finding a curved branch for a curved job, working with rather than against its idiosyncrasies.

It is hard for the drawing-board designer, who has never handled a brick (to return to our original example) or felt the consistency of mortar, to know all its secrets. If he or she designs in isolation, as happens far too often, the bricklayer may produce happier results, but it is usually one-sided, and even with this benefit, the designer seldom achieves the feel for the material that a good craftsman has. Hence, perhaps, the enormous amount of work in recent years that seems to go against the nature of the material, and in which radically different materials seem all too readily interchangeable. Unconsulted, the dumb bricks have also become deaf.

Precise homogeneous factory-made materials bring the possibility of a different kind of relationship, with new rules and a new kind of cold elegance. They lend themselves to a pure and abstract visual aesthetic, and will probably become more familiar, but through a relation of eye and brain rather than hand.

Authenticity of structure

Just as real brickwork is clearly more authentic than brick wallpaper, so some structural designs are regarded as more authentic than others because they distribute loading in a more logical manner. Although with modern techniques it is possible to make the most unlikely things stand up, architects and engineers know that structural headstands are difficult and expensive. The implicit (if not always explicit) rules about logical structure are widely held, and frequently discernible at student crits in architectural schools, where a strong consensus is usually obtained on structural matters.⁷

However, when it comes to rephrasing the Kahnian question as 'what does the structure want?', as great a variety of competing interpretations emerge as over the question of the brick's wishes. This is not to say that anyone doubts whether a Maillart bridge works structurally — it stands, and has for a long time — just that this was not the only way to do it, and not necessarily the best way, 11. Recourse to the calculations does not really help, for these too are an interpretation, a modelling of the passage of forces, involving certain assumptions and approximations. It is possible to make different assumptions and interpret structures in different ways, also with more or less precision. Given the sophistication of modern computers, for example, Maillart himself might do it rather differently. Giancarlo De Carlo has recently provided an interesting example with his competition design for a tower in Siena, 12. The eccentric loads on the structure are taken down by an irregular series of diagonal members precisely calculated on a complex programme, a new interpretation of structure giving rise intentionally to a fresh image.⁸

This question of interpretation was much in evidence during engineer Mark Whitby's lecture on authenticity.⁹ When speaking about Ironbridge he could confidently dismiss certain decorative frills as superfluous to the structural form, but when it came to Owen Williams' sports hall at Wembley, 9, the reading was more ambiguous. Whitby was concerned particularly with the projecting fin-like elements which seem to balance the portal frames. In the first project these were rounded in a way that appeared structurally expressive, but they were built rectangular, which was structurally more efficient by calculation and easier for the construction process.

For Whitby, structural authenticity was clearly linked with a reading of efficiency, economy of means, and clear expression of the passage of load.¹⁰ Following Frank Newby, he criticised the Hongkong Shanghai Bank for taking loads up and then down again, 10, though he found much to praise in the structure of Foster's latest building, the Stansted air terminal, 13. He was not altogether happy with Santiago Calatrava's Barcelona bridge because the ties on the pedestrian side appear to be doing very little work. Calatrava seems to be an interdisciplinary heretic. As the celebrated German engineer Jrg Schlaich put it: 'all the architects say what a good engineer he is, but the engineers all regard him as an architect.'

Perhaps the most direct way to find out how the structure 'wants'



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14 A south German baroque church: structure is concealed in the architect's design in favour of a greater truth than structural expression.

15 House at Lewisham self-built to the Segal system.

16, 17 Peter Behren's AEG Turbine hall: gable walls play stylistic games at odds with portal frame.

18 Florian Beigel finding out how a structure 'wants to be' by the hanging chain method.

to be' is to allow the forces to dictate the form in a physical model with hanging chains, a method pioneered by Caudi and used more recently by Frei Otto. Florian Beigel, once a pupil of Otto, talked¹¹ about the authenticity of this kind of shape-finding, 18. It probably does not get more widely used because gains in terms of efficiency tend to be offset by difficulties in terms of construction and assembly.

The production and assembly process often deeply affects the form that is built, adding a logic of its own that may cause substantial deviation from a purely structural form: this was something discussed both by Whitby and Beigel. Perhaps the last word in architectural authenticity based on a discipline of assembly, as opposed to purity of structure, is the uncompromising late work of Beigel's mentor, Walter Segal, 15.

Conclusion

There are architectures, South German Baroque churches will serve as a good example, 14, where a more direct expression of material qualities would undermine the ethereal spatial experience which is the essential aim. In these buildings craftsmanship is bent towards the victory of the spiritual over the material; thus one story is told on the outside, another within, while the brute facts of how it is achieved are concealed as completely as possible. This is a vigorous reminder that tectonic expression is not obligatory.

However, all real buildings have to be built and so tend to reflect the construction process in some degree. Thus the tectonic

has become a perennial theme in architecture, even Baroque churches reflecting myths of construction in pilasters and other Classical details. In that case it is a kind of tectonic fiction, as opposed to tectonic fact, but how sure can one be of tectonic fact? It seems rather telling, to pursue this metaphor further, that the factual side of the library has always been called non-fiction, as though claims of factualness were too ambitious.

Structure, construction, and an appropriate use of materials are all subject to interpretation, and are also interdependent, needing to find a state of mutual balance, if expressed at all. As it was part of the Modernist programme to break down and redefine the nature of the constructive process, to redefine the authenticity of the tectonic, isolated details can be found relatively easily in Modernist work which seems to reflect structural or constructive truth. Yet when the building they belong to is looked at as a whole, the procedure is nearly always found to be selective¹² (perhaps always).

A celebrated early example is the pinjoint in Peter Behrens' AEG Turbine hall, 16, 17, often taken by historians as proof of burgeoning Modernism. Yet the gable wall and corners of this building play stylistic games quite at odds with its portal structure, appearing solid and structural when in fact merely a cladding. Later Modernist examples are perhaps less glaring, but the principle still applies that the expression is selective. At Gunnar Asplund's masterpiece, the Gothenburg law courts extension, 19, the expressed frame on the facade is a covering for the real frame, following joints and changes in size of its members. Yet archive



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drawings show that Asplund was by no means wedded to this idea, and might as easily have rendered the whole thing over.¹³ Inside the building, the stuccoed columns and beams do follow accurately the steel structure which they cover, and the glazed lift is exposed in all its pre-hi-tech glory, yet certain columns are quietly swallowed within partition walls, and not a clue is given how the cantilevered ceilings are supported. With his celebrated crematorium portico at Woodland, Asplund goes as far as deliberate deception, 20. The apparent timber roof structure exposed on its underside is in fact supported by a set of steel beams which do not even run in the same direction, but radially.

Though Asplund was cut off in his prime, his one-time partner Sigurd Lewerentz had the chance, at the end of a long life, to make a final statement about the nature of architecture, and it is a tectonic statement **par excellence**. It is the church of St Peter at Klippan, 1963, whose unorthodox brickwork was considered earlier, 3, 4, 21, 23. This building and discussions about it were crucial impetus for the authenticity series, and it was mentioned by Colin St John Wilson, Peter Smithson and Florian Beigel.¹⁴ Here Lewerentz, already in his 80s, turned his back on his classical past and sought to reground his work in a new poetry of construction. The redefinition of the brick's role generates a striking new image, but also stops one in one's tracks and makes one think. This is equally the case of many of his other techniques: the window redefined as a hole in the wall capped by a frameless sheet of glass on a bed of sealant, the ironwork with naked welds unground, the laminated timber doors with their movement joints, the copper-skinned brick vaults on rolled steel joists.

Anyone else would have painted the great steel cross supporting the church roof, but Lewerentz just let it rust, a powerful symbol of suffering. Architecture has always played with tectonic fictions, such as the beam ends of the Greek temple which became trygliphs. But as these fictions moved further from tectonic fact to turn into mere stylistic conventions, they lost their power and their relevance. With his chapel of the Resurrection of 1926, 22, Lewerentz demonstrated his great skill in the classical manner, but in later years he recognised that this language divorced ever further from its origins, could be stretched no more.¹⁵ Thirty years on, his bid for a new authenticity, creating a new image through a new grounding in ways of making, is still deeply provocative. □



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- 19 Asplund: law court extension at Gothenburg: the expressed frame is an aesthetically appropriate covering for the actual structural frame.
- 20 Asplund's Woodland Crematorium portico: the apparent timber roof structure is in fact supported by a set of steel beams.
- 21 Facade of Lewerentz's church at Klippan.
- 22 Lewerentz: Resurrection Chapel of 1926: the end of the line for Classicism?
- 23 Window detail at Klippan.



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Notes

- 1 For a detailed analysis of Red House see my article in AJ 18.1.86 p38-55
- 2 This led Florian Beigel to declare the concrete building with bricks as the aggregate. For my comments on St Peter and Klippan see *Space and Society* no 53, Jan/March 1991
- 3 One of the lesser known figures of the 1920s, responsible for Böttcherstrasse Bremen and the Worpsswede artist colony; see Wolfgang Peht, *Expressionist architecture*
- 4 Aware of the growing divide between designing and making, W.R. Lethbridge wrote in *Leadwork* of 1893, 'the only way in which the crafts can again be made harmonious by beauty is for men with a sense of architectural fitness... to take the actual workmanship and practice themselves'
- 5 George Sturt, *The Wheelwright's Shop*, Cambridge, 1923, p24
- 6 Most contributors to the authenticity lecture series talked about materials and details, and the contrast between craft and machine production was a recurrent theme, also the irony that much High-Tech is hand made. Eva Jiricna (lecture on 4.1.90) did not tackle the issue directly, but reading between the lines it became clear that for her authenticity resided in the appropriate and economical use of materials. She spoke at length on the problems of control, and suggested a deliberately restricted palette: 'use only three materials if possible'
- 7 That is to say, it is clear to all staff present that a student has got it wrong even if they would differ in their advice on correction
- 8 He describes this in *Spazio e società* no 53, Jan/March 1991
- 9 South Bank Polytechnic 3.12.90
- 10 The most controversial of Whitby's examples was the structural facade of Seifert's Centrepoint, a very elegant solution in engineering terms, once it has understood it. Whitby declared the building underrated, but his architectural audience remained hostile. The trouble is that there is so much decorative and disrupting and trivialising the resulting structural form: third-rate architecture masking first-rate engineering
- 11 South Bank Polytechnic, 4.3.91, a version is to be published in *Architecture Today*
- 12 This is a vivid reminder that we are always concerned with what is expressed, seen and can be read. Florian Beigel quoted Segal's insistence that architecture should appeal to the mind as well as the eye, meaning that it should be able to sustain contemplation and close scrutiny, yielding some kind of intellectual consistency, and rewarding imaginative exploration
- 13 Drawings are shown in my *Massachusetts Building study*, AJ 14.10.87
- 14 In their South Bank Polytechnic lectures of 12.11.90, 26.11.90, and 4.1.91 respectively
- 15 Colin St John Wilson argued this very elegantly in his essay for the *Architectural Association Lewerentz exhibition catalogue*, 1990.

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