The good, the bad and the juggled: the new ethics of building materials

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In much environmental analysis, architecture is reduced to a fraction of itself: the architectural-artefact-as-physical-object. Its symbolic and self-referential capacities, its aesthetic and spatial concerns – that which conventionally characterises it as ‘design’ – are dismissed as irrelevant to the crisis at hand. What ‘meaning’ architecture is permitted thus tends to be discussed in quantifiable terms: energy ratings, insulation values, etc. This data, however, only has meaning because it is contained within a larger hermeneutic framework, an ethical one. That is, buildings meeting certain environmental performance criteria are deemed ethically acceptable because they are taking into consideration the well-being of a larger community, whether that community is exclusively human, or inclusive of all life. This is a new definition of the ethical in architecture, new because what is conventionally viewed as a qualitative judgement is being considered in quantitative terms, with all the problems of interpretation inherent in such a direction.

It is doubtful whether those who defined ethics as ‘moral science’ viewed it as an empirical one, and yet that is precisely what is being brought into the domain of ethics through the development of environmental design. This design includes ‘sustainable architectures’, a more self-conscious category than sustainable building. Though defining sustainable architecture is highly contentious, a working definition is needed for the purpose of this discussion. So, crudely, it is an architecture whose conventional constituent parts – the tectonic, the topographical, the symbolic, the social, etc. – are each informed by the exigencies of environmental design, the declared aim of which is to stop the built environment from polluting the biosphere. Currently it contributes approximately 40% of all greenhouse gases. Thus Michael Hopkins and Associates’ Inland Revenue Buildings in Nottingham, Short Ford and Associates’ Queens Building at De Montfort University, Leicester, Jourda and Perraudin’s Professional Training Centre in Herne-Sodingen, Germany, and Renzo Piano’s Tjibaou Cultural Centre in New Caledonia are concerned both with representation and with environmentally acceptable operation.

Not only that, but they have adopted a complex inclusive approach to both, so that contemporary expression and contextualism are embraced within representation, and traditional environmental techniques and advanced ‘green’ technology are embraced within operation. Not all architecture claiming ‘sustainability’ subscribes to this inclusive approach. In some cases, an anti-modern environmentalism dominates, in which traditional
vernacular is employed much more literally; in others, a preoccupation with new technologies and materials predominates. As will become apparent, within the new materialist remit of environmental ethics, those who tend to be dismissed architecturally – the architects following tradition most closely – are held by some within environmental design to be the most ethical, while those pushing the technology envelope are condemned as the least ethical.

In noting the introduction of empirical science into the ethics of environmental design, I mean not so much that the science involved is contained within an ethical framework, though this is so, but that the framework itself is in part constituted by this empirical science. That is, ethical behaviour within architecture has a newly acquired material, as well as moral, basis; or rather, this moral basis can now be supported quantitatively as well as qualitatively. This is not to say that quantity does not enter into conventional ethical judgement. Our concept of justice derives quantities of guilt from the quantity of intention judged to have been involved. This is expressed in ‘degrees’ of murder: ‘first degree murder’, because entirely intentional, receives a quantitatively greater punishment than ‘second degree murder’, or manslaughter.

The same correspondence between the ethical and the quantitative holds true in environmental design, but the relationship goes further: there are not only measurable degrees of pollution, there are also measurable proofs of degrees of pollution. These measurements are the result of an analysis of what is called embodied energy in buildings. Embodied energy is that contained within the materials constituting a building. It is a measurement of the energy used for the extraction and preparation – or manufacture – of building materials. If this energy were clean, say, solar, it would be unproblematic. But, for the most part, it is fossil fuel energy – oil, coal – which is generally agreed to be overheating and polluting the atmosphere. Wood, for example, has the least embodied energy, requiring 639 kilowatt-hours per tonne to bring it into being. Obviously, wood is created by solar, not fossil energy, but it is expressed in equivalent terms to serve as a yardstick against which to measure building materials that are produced with fossil fuels. For example, brick requires four times the amount of energy to produce as wood does. Glass requires 14 times the amount, steel 24 times, and aluminium a staggering 125 times the amount.

Embodied energy is one part of a larger, much more complex appraisal of the materiality of buildings called Life Cycle Analysis (LCA), which takes into account not only the energy embodied in materials, but that expended in bringing the materials to site, usually by truck, assembling them into a building, and, at the end of the building’s life, recycling or dumping the unwanted materials. One moves, therefore, from the relatively more precise but generalised quantities of embodied energy to very imprecise juggling acts between one variable and another involved in LCA. For example, steel requires relatively large amounts of fossil fuel for its manufacture relative to concrete. But the steel foundry may be 10 minutes away from the site, and the concrete may require a much higher expenditure of fossil fuel to transport it there. The
steel may also be able to perform the structural task more efficiently, which means that less of it may be required than of concrete, again complicating the judgement. Then there is the death of the building to consider. Steel, as components or scrap, is recyclable; reinforced concrete, as material rather than building, is not.

This Life Cycle Analysis of buildings obviously requires qualitative judgement, but the extenuations mentioned above are themselves quantified. The juggling may be complicated, but the alternatives juggled can be measured. Nevertheless, the concept of embodied energy is unique in the clarity of its equation of the quantified with the ethical. This clarity has its dangers. If one omits the complexities of a case-by-case application of materials, then it is all too easy to declare that those buildings made of materials with a high pollution quotient are ‘bad’, and that those of materials with a low pollution quotient are ‘good’. Thus to use embodied energy as one’s moral yardstick is to run the risk of falling into not only a reductive, but a regressive view of the architecturally acceptable. For within these parameters, architects closest to traditional vernacular models can be judged most ethical because their strategy requires the least expenditure of fossil fuels. Their chosen materials tend to be ‘natural’ – wood, stone, thatch, earth – and are often hand-extracted and finished. These natural materials require little or no fossil fuel for their use, compared with industrially extracted and processed materials such as steel and glass. Those architects furthest away from the vernacular model, ex-high-tech proponents such as Richard Rogers and Norman Foster, who are now developing a form of ‘high green tech’, are conversely attacked for the high amount of embodied energy in their state-of-the-art, steel and smart glass wunderkinder: amounts of embodied energy that are deemed ethically irresponsible.

The basis for these judgements of good and bad derives from the effect of pollution on the community-as-consumers, not, or not yet, as producers. There is very little Ruskinian, let alone Marxist, analysis within environmental writing of the ways in which certain modes of production are unethical because they deprive the worker, not only of health, but also of self-expression and/or self-governance. There are, of course, many critiques of the establishment-as-producer, the existing political-industrial complex and its wicked polluting ways, but the ‘wickedness’ is judged again by the effect on our health and the health of our planet, not on the effect on the working conditions of those employed in this production. There is a strong anti-urban, anti-modern contingent within environmentalism, but this tends to a sentimental celebration of traditional craft culture as ‘lifestyle’, not usually to critiques of production from the employees’ point of view. Such a lifestyle may be attractive to Western middle-class pre-Raphaelites, but it doesn’t do much for the 50% of the world’s population crammed into cities, nor for a world gasping from the southern hemisphere’s geometrical increase in industrial production.

The terms ‘good’ and ‘bad’ are very much within the domain of religious language. ‘Purity’ and ‘pollution’ connote spiritual cleanliness and uncleanness as well as literal cleanliness and filth. Within the Christian hermeneutic, literal cleanliness
and filth are the outward and visible signs of an inward and invisible state of grace or its lack. Within the environmental hermeneutic, they are the outward and visible signs of a consideration for the community, or its lack. Ethical work practices in the factory or on the building site may be beyond the reach of the architect, but ethical specification of building materials is not. Is it ethical, therefore, to put the high performance of, say, aluminium, before its quantifiably demonstrable damage to the environment, and thus to the community's health? It is only the scientific analysis of building materials from this particular quantitative perspective that has enabled such a question to be asked, and such an ethical position to be taken or refused. This conclusion raises two larger issues. The first is the seemingly automatic equation of the ethical with the environmentally concerned, and the second is the revaluation of the materiality of architecture through the re-minted ethical significance of that materiality.

To take the first question first: who awarded this badge of ethics to environmentalism? Did environmentalists claim the moral high ground unilaterally, or does environmentalism conform to the requirements of the ‘moral science’ so strictly that such an award is inevitable? If we take as a very basic definition of the ethical that position which considers entities as things-in-themselves rather than as means to ends – if, in other words, to be ethical is to repudiate instrumentality – then environmentalism certainly qualifies as ‘ethical’: ‘nature’ is no longer to be seen as ‘a storehouse of matter’ (Francis Bacon) for our exploitation. The disagreements come in defining these ‘entities’ within the context of environmentalism. Are they exclusively human? Are they all living things? Or are they all living things before the human (the whole before the most presumptuous part), which is the position of ‘deep ecologists’? This clash of definitions points to a not infrequent clash between environmental sustainability and social sustainability. Which position, for example, is more ethical: concern for the lives of trees, or concern for the livelihoods of the loggers felling those trees? One could argue that concern for the trees is a concern for both, as loggers, like the rest of us, need to breathe. Despite such conflicts of interpretation, however, I think one can say with some justification that environmentalism as a whole is ethical, in that it seeks a cooperative, rather than exploitative, relation between humans and the biosphere, which often involves establishing similar unexploitative relations between groups of humans.

There are, then, within environmental design, ‘categorical imperatives’, to use Kant’s terminology, ‘thou shalt’ and ‘thou shalt not’, but the content of these imperatives is under constant debate. Nevertheless, a large element of utilitarian ‘greatest good for the greatest number’ informs environmental judgements, and with the exception of the deep ecologists, this is usually taken to mean the greatest number of human beings. The ‘good’ in this case is universal physical health and well-being, and a fairer distribution of natural resources and their benefits, but not at the cost of the health and well-being of either the planet, or of future generations of human beings.

The second issue raised by this area of empirical ethics is the revaluing of materiality, not only in
architecture, but in design as a whole. It could be argued that such a revaluing affects all material production, but architecture and design are also concerned with representation, and therefore hold a much more self-conscious and ambivalent position with regard to their materiality than does, say, the manufacture of engine parts. This revaluing of materiality is of interest in architecture because of a prevalent perception of its present devaluation. As Scott Gartner observes:

‘The overemphasis on signification and reference in architectural theory has led to a construal of meaning as an entirely conceptual phenomenon. Experience . . . seems reduced to a matter of visual registration of coded messages . . . ’

It may be no coincidence that the writings of Gottfried Semper are currently the fashion, as his privileging of the message over the medium, indeed his separation of the two, is very much in step with a contemporary critical orthodoxy that privileges the text over the thing, and in some cases renders the thing text. Semper’s *Bekleidung* or ‘Principle of Dressing’ promoted, through decorative and/or screening devices, the masking of the ‘matter’ or solid structure of a building in order to liberate culture from the material world. As he says in *Der Stil*:

‘This annihilation of reality, of the material, is necessary if form is to emerge as a meaningful symbol, as an autonomous creation of man.’

The ideological argument between those, like Semper, who believed the message transcended the medium, and those, like Viollet-le-Duc, who believed the medium was the message, raged fascinatingly all over northern and middle Europe during the mid to late nineteenth century. It was not of course couched in Marshall McCluhan’s terms, but in moral ones. While Semper addressed himself to the transcending of matter, a project that continued the traditional Platonic privileging of intellect and/or spirit over the body and the material world, Viollet-le-Duc, and Ruskin before him, pointed towards a moralising ‘truth to materials’ as justification for rejecting the ‘lies’ of deceitful decoration and imitation. As Ruskin says in *The Seven Lamps of Architecture*:

‘XVI. Touching the false representation of material, the question is infinitely more simple [than structural dishonesty], and the law more sweeping; all such imitations are utterly base and inadmissable.’

Unlike Ruskin, Viollet-le-Duc did not condemn industrially produced materials. On the contrary, he was searching for a way to use and express them ‘honestly’. The later dictum of Adolf Loos, ‘ornament is crime’, is very much in the same spirit, conflating a host of sins. Ornament is crime because it is wasteful of the craftsman’s labour; because, like a woman’s cosmetics, it is deceitful; and because, like a barbarian’s tattoos, it is primitive. Far from rejecting ‘mere matter’, Loos saw it replacing ornament as an indication of status in the form of luxurious natural materials, which he deployed with consummate skill. But Viollet-le-Duc’s earlier version of this moral rectitude was even more radical:
'In architecture there are two necessary ways of being true. It must be true according to the programme and true according to the methods of construction. To be true according to the programme is to fulfil, exactly and simply, the conditions imposed by need; to be true according to the methods of construction is to employ the materials according to their qualities and properties . . . .'\(^4\)

This begs various questions. Are there only ‘two necessary ways of being true’ – that is, virtuous? Is architecture-as-representation any less true than architecture-as-programme-and-structure? Are meanings other than tectonic ones any less true? The nineteenth-century debate, on one level, was about metaphor. Is it moral to express a truth figuratively – that is, ‘untruthfully’ – with wood painted as marble, or joints developed in one medium, say wood, reproduced in another, say stone? Is a figurative truth (a metaphor) then a lie? What if the message is about the irrelevance of Ruskinian ‘virtue’? The threat that the moralists perceived in the separation of representation and material constitution implies that one can draw a clear line between them. However, the closer materiality and representation get to each other – that is, the nearer the medium comes to being the message, or rather a message – the more this line is blurred.

This is certainly true within sustainable architectures, in which the ‘thingness’ of building materials keeps spilling over into the domain of the symbolic. The use, for example, of locally available materials in sustainable architectures certainly addresses the building-as-physical object, in that it is attempting to keep the use of fossil energy to a minimum, but at the same time the choice of those materials is culturally as well as environmentally significant, in that it employs the palette of the surrounding traditional context. And, of course, environmental significance is itself culturally significant, and culturally constructed. In fact, one could argue that it is easier to pursue the building-as-sign and dismiss its materiality – assuming it can stand up and keep out the rain – than it is to pursue the building-as-thing and dismiss its representational role, as its very thingness, its materiality, can’t avoid bearing meanings.

In sum, the introduction of morality into nineteenth-century architectural debates was largely misdirected. The ethical problem lay in the means of production, not the means of expression. It was through the new mass production of materials that the community – of workers, citizens and nature – was endangered, as Ruskin warned again and again. This was not the direction the argument took, however. Architects, understandably enough, were more interested in that over which they had some control, and they had more control over architectural expression than over industrial production.

Later twentieth-century arguments about materiality have carried the same emphasis on expression rather than constitution. Semperians were replaced by semioticians, and materialists by phenomenologists, though the latter were as eager to avoid the dead hand of modernist functionalism as they were to wrest architecture back from those who had so successfully dematerialised it into a system of signs. The Heideggerian phenomenology
popular in architectural circles in the 1970s and early 1980s, and typified by the writings of Christian Norberg-Schulz, was a return to ‘the thingness of things’, to use Heidegger’s phrase. Part of the project was to rescue theory from its ‘lost contact with the concrete life-world’. Heidegger was particularly useful in this regard, as he expressly insisted on the reality of the referent:

‘All significations, including those that are apparently mere verbal meanings, arise from reference to things.’

But rendering buildings as dumb as rocks is as problematic as considering them as articulate as texts. In Norberg-Schulz’s book, *Genius Loci: Towards a Phenomenology of Architecture*, the mouth-watering images he provides of desirable material conditions within architecture – cobbled streets, worn walls, nooks and crannies – were usefully communicable only insofar as they were reported in texts, while the act of transforming the physical into the textual removed the spiky material particularity for which the examples had originally been chosen. One was faced with the paradox of trying to restore to primacy the sensory experience of the material through the very medium that had devalued it in the first place. More interestingly, however, Norberg-Schulz pointed to the place that sustainable architectures would later occupy. He was after a ‘phenomenology in the sense of environmental awareness, a rediscovery of the world as a totality of interacting, concrete qualities’. This language is remarkably similar to that used in writings on environmentalism, and yet the leap is never made to viewing the building as a truly ‘interacting concrete’ thing bound up in a world of ‘interacting, concrete’ things. The ‘thingness’ of buildings was still of interest to this phenomenological school only insofar as it served expression, in this case a poetics of materiality. An ethics of materiality was never developed, because the science of materials that is its foundation, and the consequences of that science for the community, were too embryonic. This still seems to be the case among those outside environmental design who have an interest in materiality.

A sophisticated analysis such as that performed by David Leatherbarrow and Mohsen Mostafavi on Herzog and de Meuron’s Goetz Gallery, Munich (1992) addresses aspects of the physical properties of the building’s stone and glass, but it is the gallery’s confounding of the conventional readings of these materials that interests the writers in their article, more than the stone and glass as things-in-themselves.

‘The “lightweight” glass used in the façade of [the] Goetz Gallery in Munich, for example, gives the impression of supporting “heavy” stone. The reversed position of these materials contradicts the normative logic of construction, an apparent irrationality which transforms the semantic associations of the chosen materials [my italics] – stone / traditional, glass / modern.’

Here, the interest is semiological, not ontological, even though the ‘semantic associations’ are based on the traditionally perceived physical properties of the stone and the glass. These physical properties
are not included as things-in-themselves, but as lost referents.

The architect Raphael Moneo is also concerned with loss:

‘I think that perhaps we are so concerned with materials because we feel that their importance escapes our world somehow. It may be that we have lost contact with their meaning. This procedure involves, perhaps, a certain nostalgia for an architecture in which materials would play a more important role.’

Part of this lost meaning concerns the loss of ‘natural materials’, which had clearly perceivable ‘natures’. New compounds and polymers make their physical properties much more difficult to ascertain, and their ‘meanings’, in the sense of stone–load-bearing / glass–light, much more difficult to derive. But there is now the possibility of other meanings inherent in materials – ethical meanings. The new concept of embodied energy in building materials has enabled expression to be linked directly to means of material production, and thus to real, as opposed to imaginary, ethical dilemmas; that is, ones that directly affect the well-being of the community in a way that the ‘honest’ expression of materials or their masking does not.

The new ‘truth to materials’ is not that of ‘telling the truth’ about them, as in ‘what you see is what you get’, but of weighing up the effect of their production on the well-being of the community. Being able to read clearly what a building is made of, and how it is made, is irrelevant within this new dispensation. What is important is the fact of a material’s presence, not its readability. Wood may be painted to look like aluminium, but the deception is harmless. What would be genuinely harmful, under certain circumstances, and thus unethical, is the use of real aluminium. A nostalgia, then, for a lost meaning in materials is unnecessary. Looked at differently, in architecture and design, there is a world of meaning in them, meanings that have the potential, if those on either side of the environmental divide recognised the value of the other’s interests, of joining the ontological and the representational, of reconciling the ‘nature’ of materials with the culture of meanings, and ‘truth to materials’ with the widest possible aesthetic expression of that truth, expression that could well include the ‘evils’ of imitation and ornament.

Notes and references
