

Reflections on the imagination and design of soundscapes

Mountains and an alternative history of modernism

The design of acoustic environments

As I write, I am occupying an attic office and it is a hot sunny day. The windows are open to encourage the blue and red ventilation arrows that make life tolerable in a passively cooled space, and as a consequence, the acoustic insulation afforded by the fabric of the building is almost entirely short-circuited. I'm 30 metres from one of the main traffic arteries that connect Nottingham city centre to its environs – one of the radial arms you will see fringed in red on a noise map of any reasonably sized city. My actions have invited in the acoustic energy generated by numerous people commuting between, home, work and places of leisure, and in so doing have changed the sound map in my office from an acoustically comfortable light blue, to pale red.

Is my lot any the worse for the decisions I have made in configuring my environment? For me, today, the answer is a clear 'no'. The benefit of a cooling flow of air outweighs the cost of increased sound pressure levels in my room and, besides, I am occasionally a driver or passenger in the vehicles that make up the leading performers in the city's occasionally discordant orchestra. My relationship to this key source of sound is one of complicity. Perhaps more significantly, however, I could, should I wish, easily retire to a dry, cool, quiet basement room and fill it with the sporadic tap of my laptop keyboard.

Rewind 12 hours and you find me in the room below my office being woken by the dawn chorus blaring through another window left open to mediate thermal comfort. I'm not sure if these are the species of urban birds that have raised both the pitch and the intensity of their

song to compete with the urban soundscape but, no matter, in the relative absence of early morning road traffic, they are the dominant source of sound. I am relieved that the room has cooled sufficiently for me to close the window and, as much as I am a fan of BBC Radio 4's 'Tweet of the Day', allow me to escape from what is an unwelcome source of noise and return to an undisturbed slumber.

These pictures of activity – thermal environment, acoustic environment, and the freedom to effect control – represent only part of what is a complex mesh of interaction. Stripping the problem back to the two key stimuli covered in Michael Fowler's paper on soundscapes (*arq* 19.1, pp. 61–72), the visual and the aural, and borrowing some of the concepts from ecological optics developed by Gibson, offers a glimpse of the types of relationship which designers of the built environment have the power to influence. Gibson considers what we see as an

ambient array of light reflected from *surfaces* with differing brightness. This we interpret as the objects we are (usually) familiar with. The information in this array is dynamic, varying as time passes or as we move through our environment. It is interpretable by virtue of the contrasts that exist within the scene – a scene that lies somewhere between the states of *blackout*, where there is a complete absence of light and *whiteout*, where there is an absence of contrast between objects.

Transposing the same thinking across to the acoustic domain, the environment we typically inhabit lies somewhere between a silent blackout and a whiteout that might be represented by the featureless hiss of white noise. Unlike the optical ambient array, which encloses the observer with that which may be seen, the acoustic ambient array also offers clues as to the unseen – the world that lies beyond the visible. Our presence within a space generates



1 Lars Spuybroek and Edwin van der Heide, *Water Pavilion* (1993–7), Neeltje Jans, The Netherlands

sound that feeds back on its volume and hints at materiality. The acoustic ambient array also links us to the activities of others taking place elsewhere, out of sight. It can comfort us by confirming we are not alone, it can irritate us if we deem the activity giving rise to what we hear is unreasonable. Recent work with colleagues at the University of Nottingham looking at the response of residents living in the vicinity of small wind turbines adds personality traits, such as neuroticism and frustration intolerance to the list of factors that influence this relationship between listener and sound source – audible or otherwise.

The majority of soundscapes will fall somewhere within the infinite range of possibility that exists between acoustic blackout and whiteout. Constructed from patterns of sound pressure that couple short- and long-term variations of intensity with variations in frequency content, it is clear that deciding upon what is acceptable and appropriate for any given situation is a rich and complicated problem.

The time-averaged sound pressure levels used to define Gidlöf-Gunnarsson and Öhrström's acoustic *black* or *grey* areas offer only a part picture. The diversity of acoustic need that exists within a population and the shifting expectations that will be present for each individual within that population militate against the use of the simple metrics we currently employ to describe the problem and the means we employ to control it through target reverberation times or limits on transmitted noise. Beyond this, the notion that we are dealing with a purely acoustic, or visio-acoustic design issues will increasingly be challenged. It is likely we will need to consider complete environments and through understanding the variety of stimuli that affect comfort in the broader sense, identify how the individual may make use of the opportunities these environments afford to improve their lot.

The nature of the acoustic questions alone, however, represents welcome seeds in what has been a relatively barren field of enquiry in the area of architectural acoustics. The interrelated nature of the perceptual system that soundscapes sit within necessarily implies a much broader and diverse set of research questions: questions that will demand a multidisciplinary approach to

finding answers. Opening-up opportunities to progress our understanding of architectural acoustics and its place in our relationship with the wider environment will require seeding the rainclouds of research funding. Making a case based on our current understanding of the cost, be that social, wellbeing or productivity, of ill-designed acoustic environments is relatively straightforward.

At present, framing the questions themselves represents a challenge above and beyond the pursuit of their answers. Architectural discourse has a valuable role to play in shaping how we think about our relationship with our environment – it offers different ways of conceptualising problems, and from this, different ways of approaching their solution. Fowler makes the case for architectural practice embracing the design of acoustic environments – in part to add to the delight of architectural environments and in part as a reaction to the increases in acoustic energy density that occur hand-in-hand with processes of urban densification. This implies, to me at least, application over a range of architectural spaces and, with this, differences in the emphasis the designer places on weaving acoustic design into the wider palette of environmental considerations. Those that we harness to generate Broadbent's 'meaningful form' are likely to build upon those that we have in place to cater for the spaces where we spend the majority of our time – the spaces of the everyday.

The ability to simulate acoustic surfaces and spaces, coupled with the facility to auralise design propositions, offers the means by which the sound in, and of, space may be accommodated within the iterative and open ended cycle of the architectural design process. At present, the tools required to do this are dispersed and the dependency designers have on specialists keeps everything at arm's length. If, as is happening with other components of environmental design toolkit, there is a drive to absorb these into the everyday CAD workhorses used in practice, the way lies open for architectural practice to put them to work.

The precise manner of their use may evolve through experience gained by trial and error on a project-by-project basis and would certainly benefit from the focus that fundamental research can offer when presented with

carefully framed questions. Both avenues provide opportunities for the ongoing dissipation of architecture's boundaries as defined by Guédon and Bogнар, or if turned on its head, the opportunity for those with an architectural training to specialise. The core architectural skill of collaborative interdisciplinary working to tackle complex problems and develop creative solutions naturally finds a home in architectural practice. Perhaps, given the scale and complexity of the challenges faced in understanding how to design complex environments, there is an even greater need for these skills in shaping and progressing the research required to underpin environmental design in practice.

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A mountainous history of modern architecture?

Hans Castorp, a young engineer, is the protagonist of Thomas Mann's famous novel *The Magic Mountain* (1924).¹ The narrative happens in the Berghof, an imaginary sanatorium to be found somewhere in the Alps. The building, as described by Mann, is composed of individual terraced rooms facing south and shared facilities on the lower floors – including restaurants and spaces for socialisation as well as medical offices and technical spaces.

Castorp and the other inhabitants of the sanatorium – other patients from many different backgrounds and ages, doctors, staff, and temporary visitors – constitute a sort of isolated community living away above the 'flat-land'. They enjoy resting and sunbathing alone on the terraces outside their bedrooms while contemplating the unique landscape of the Alps. In the daily routine of the young engineer and his colleagues, the individual contemplation of this unique mountainous view often provokes the effect of introspection in their souls, allowing them to reach a better knowledge and awareness of themselves and their life. This reflective experience is also stimulated by a series of group discussions held in the restaurant and other communal areas. These informal meetings are fostered

during the daily rituals prescribed by doctors and also during sporadic activities organised by the protagonist or his colleagues in the sanatorium. The rhythm of this reflection is marked by the Socratic struggle between Naptha, a former Jew converted to a radical Catholic Jesuit, and Settembrini, a liberal thinker who represents Enlightenment values. They talk intensely on a wide range of topics including time and its perception, music, history, homeland, identity, philosophy, illness, and death. These are concepts from the Western tradition associated with modernity, and their discussion in the novel is ambiguous, conducted through encyclopaedic and opposing arguments.

Although the building is not situated in the Alps but in the middle of a Danish suburban area, the Mountain Dwellings project [2] by Bjarke Ingels in southern Copenhagen, discussed by Deniz Balık and Açılya Allmer in (arq 19.1, pp. 30–40), could serve as a sort of contemporary idealisation of the sanatorium in Mann's novel. We can imagine Hans Castorp and his colleagues living in BIG's building instead of in the Berghof. They could contemplate the landscape from its balconies, climb the stairs next to the perforated representation of the Himalayas instead of the real Alpine hills and experience their intense discussions in the different private and shared spaces of the building. However, Bjarke Ingels do not make any explicit reference to Thomas Mann's masterpiece in their project. Indeed there is no explicit connection between Mann's novel and BIG's project. But the parallel remains illuminating.

The Magic Mountain represents one of the summits of modern Western literature and Romanticism. The vast novel synthesises in a highly sophisticated manner some of the key topics and struggles of Western culture elaborated in previous centuries. These discussions are entangled with Castorp's progressive self-awareness throughout the narrative in the novel and with the construction of a strong sense of community together with his colleagues in the isolated sanatorium – in a similar way that neighbours in Copenhagen might build a sense of own community in their apartment blocks. The novel includes profuse references to the *small nation* and *homeland* created in the sanatorium as opposed to those in the 'flat-land'.



2 Mountain Dwellings, BIG, Copenhagen, 2008

It is not by chance that the strong use of the mountain imaginary in the novel chimes with the importance given to the contemplation of landscape. Indeed, the contemporary notion of landscape is the outcome of an enduring negotiation begun in Renaissance painting that was finally shaped and intensified during eighteenth and nineteenth century. This was also the time when most modern European nation building took place. Indeed, the construction of national narrations needed to appropriate the national territory and its boundaries through their description and careful representation. To this end, the contemporary emergence of modern natural sciences like geology contributed significantly, together with the development of drawing techniques thanks to Gaspard Monge's invention of descriptive geometry, which made it possible to draw accurate topographic drawings. The cultural construction of landscape by social elites complimented this scientific appropriation of territory in modern nation-building processes. The picturesque debate was a paradigmatic example of these strategies, as was the later emergence of the cultural awareness of mountains – closely related to the British, German, and French elite Grand Tour itineraries crossing through the Alps to reach idealised Italian ruins.

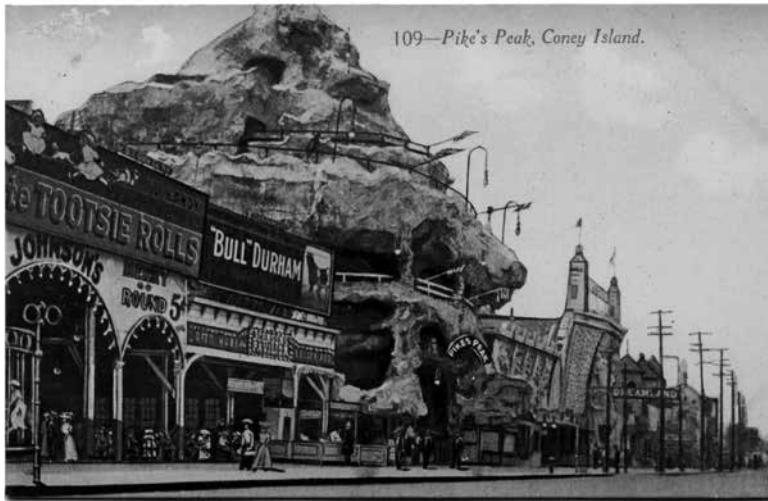
These discussions run parallel from the mid- to late-eighteenth century to the early Industrial Revolution. A century before, the literary and artistic debate, the Quarrel of the Ancients and the

Moderns, shook the *Académie Française* and later extended to the UK. The opposition between *progress* and *authority* also conditioned contemporary architectural discussion and led the debate towards questioning the supposed true origins of Architecture. The confrontation of Roman and Greek architecture as opposed to Renaissance and contemporary *faults* shaped the debate about the origin of the classic orders and Architecture until mid eighteenth century, when this dichotomy was overcome by Marc-Antoine Laugier's idea of the Primitive Hut. According to the French Jesuits, the search for truth in architecture should be driven by reason and found in Nature, as they presumed was the case for Ancient Greek Temples that owed their form to the earliest wooden log hut – an idea already outlined by Vitruvius. Nature, thus, was sought to be the ideal principle for architecture at the time and the standard form that all architecture embodied.

Shortly after this struggle over the search for the original truth of architecture in Nature and the debate around Laugier's Primitive Hut, during the French Revolution, artificial mountains were raised in central urban spaces. They were topped with Revolutionary symbols and served as settings for the processions and performances held during Revolutionary Festivals. The interest of French revolutionaries in these mountains was a political metaphor for the *Montagnards* group who sat on the highest benches in the Assembly and represented revolutionary ambitions to search for a new



3 Engraving of the Temple of Plato in Byzantium (Istanbul): An artificial mountain topped with both neo-classical and modern medieval chapels constructed inside a neo-classical interior



4 Late nineteenth-century postcard of the Pike's Peak artificial mountain aligned in a street with other different popular amusements in Coney Island, New York



5 Postcard of the miniature reproduction of Montserrat built in Barcelona's Ciutadella Park in 1895 to walk through and around for the enjoyment of citizens and visitors to the gardens. The Sagrada Família by the Catalan architect Antoni Gaudí could be understood as its religious counterpart

society and a new symbolic universe over the symbols of the *ancien régime*. But, in this context, mountains also embodied a search for a new spirituality in Nature as clearly shown by the Revolutionary projects to transform some of the major cathedrals in France into Temples of Reason through the construction of artificial mountains in them – or by projects for the construction of new Temples of Reason, like the one designed by Boullée in 1793. The Cult of Reason aimed to approach the perfection of mankind through the attainment of Truth and Liberty, and its guiding principle towards this goal was the exercise of the human faculty of Reason.

Actually, this search for a new mountainous architecture could be considered within a wider Western search for a new, idealised relation between mankind and Nature in parallel to the Enlightenment and the emergence of natural sciences as modern disciplines [3]. This new understanding defined the ground for Evolutionism and also challenged the positions on Nature defended by established Western churches through their interpretation of the Bible, which now also turned to the study of Nature with the aim to counterbalance those new scientific narrations which were trying to explain the natural environment in the terms of reason and science. As a consequence of these intense struggles, the interest in Nature and mountains became widespread throughout Europe, as was the architectural interpretation of mountains, which became popular during Romanticism, with examples in countries ranging from the UK to Turkey and from Spain to Hungary.

This was, thus, a complex discussion crossing countries that was even able to sublimate opposite positions like those of John Ruskin and Eugène Viollet-le-Duc. They were both fascinated by the study of mountains – although Ruskin approached the question from geology and Viollet from geometry – and both were excited to search for a new modern contemporary architecture. Furthermore, after the emergence of these influential cases, examples of the architectural interpretation of mountains were frequent in Western projects in the nineteenth and twentieth centuries in both popular culture [4] and 'high culture' proposals from architects.² Examples range from the hills raised in picturesque gardens around Europe and ambivalent replicas of mountains

to elaborated mountain-like buildings or mountain-related projects like those by Antoni Gaudí [5], the City Crown and Alpine Architecture by Bruno Taut and even the Bauhaus Manifesto and Program in 1919.

These architects and architectures had different, and sometimes slightly divergent aims but, broadly, they all sought to define a modern architecture in relation to Nature and to build a strong social commitment. They all tried to look for, represent and build new idealised – utopian? – communities. This purpose became more intense after the First World War with Expressionist investigations. However, the awareness of these explorations was interrupted by the outbreak of the Second World War and its consequences – similar to what happened to Hans Castorp and his Socratic growth in *The Magic Mountain*, which was broken up by the First World War. Although there are no explicit discussions of architecture discussion in the novel, Thomas Mann reflected widely the debates I have discussed here through the dialogues between Hans Castorp, Naphta, Settembirini and other protagonists in the narrative.

After the vast military destruction of many European cities during the Second World War, the architectural debate focused on the need to overcome difficult circumstances as soon as possible. The International Style was imposed in many of the cases. But orthodox modern architecture too often failed to face successfully urban conditions and discussions of representativeness, and different criticisms – including those of Organic Architecture, *Collage City*, Team X within CIAM and the Smithsons, and later Archigram – aimed to move further from orthodox modernism, culminating in postmodernist debates and beyond. During all these struggles, however, many architects have continued to explore and expand the idea of treating buildings as mountains. Gottfried Böhm, Peter Cook, Enric Miralles, MVRDV – and BIG – for example, have pursued this idea with varying intensity. Furthermore, mountainous constructions can be found in apparently popular architectures, such as the famous replica of the Matterhorn raised in Disney World in 1959. All these examples explore the idea of building a 'real' mountain and a signified mountain at the same time, and to

this end they use diverse strategies ranging from a deep understanding of material tectonic and geological strata as a criteria from which to develop their projects, to the most superficial and scenographic mountain-like forms.³

It would not be risky to suggest that histories of modern architecture only refer partially to the whole of modernity. The different histories of architecture have always related directly to contemporary professional debates, as the interpretation of the past is politically and culturally intentional: historic knowledge is always mobilised to practical ends. Probably one of the clearest examples of this is the historiography of modern and postmodern architecture through the twentieth century and its focus on debates around the so-called International Style.⁴ However, Ulrich Conrads and Hans G. Sperlich⁵ have highlighted the lack of attention paid to some works of architecture in the nineteenth and twentieth centuries and, more recently, Iñaki Ábalos⁶ has shown the potential of defining non-orthodox approaches to conventional modern architectural histories such as for example, his brilliant review of modernity under the principles of picturesque.

Considering these mountainous reflections, would it be possible to trace an alternative History of Modern Architecture here? Might it be possible to build an alternative understanding of architectural modernity that embraces the connections between the search for a radically modern architecture, the interdisciplinary emergence of the natural sciences and the shaping of modern societies and states? Would this alternative history make a major contribution to root and clarify the contemporary architectural debate on sustainability and ecology?

Bjarke Ingels has developed the idea of treating buildings as mountains in different projects. However, the idea of treating buildings as mountains is not new or unique but, as I have argued, has been explored by many architects since the eighteenth century. Perhaps, if the Mountain Dwellings project was to be considered within this mountainous history of modern architecture, we could move beyond locating it in postmodernist sensibilities and use BIG's building as another example within this alternative history. This may shed light on other projects by

BIG as well as opening a wider and more fruitful debate giving rise to radically new, ambitious, and strongly-grounded architectural discussions. Or, perhaps, this consideration may drag us towards a dream spiral and a ghostly experience full of hallucinations and confusion, like those lived by Hans Castorp during his intimate incursions into the mountain.

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Notes

1. Thomas Mann, *Der Zauberberg* (Berlin: Fischer Verlag, 1924). [English translation: *The Magic Mountain* (London: Secker and Warburg, 1927).]
2. See for example: Stéphane Degoutin, 'The life force of the grey goo', in: *Quaderns d'Arquitectura i Urbanisme*, 263 (2011), pp. 68–72.
3. Andrew Ballantyne, 'Remaking the Matterhorn', in: *Nordic Journal of Architecture*, 3, 2 (2012), pp. 34–9.
4. Panayotis Tournikiotis, *The Historiography of Modern Architecture* (Cambridge: The MIT Press, 2001).
5. Conrads Ulrich and Hans G. Sperlich, *Phantastische Architektur* (Stuttgart: G. Hatje, 1960). [English translation: *Fantastic Architecture* (London: The Architectural Press, 1960).]
6. Iñaki Ábalos, *Atlas pintoresco*, Vol. 1, Vol. 2 (Barcelona: Editorial Gustavo Gili – GG, 2005).

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