

## **Place, Time and Architecture: The Growth of New Traditions**

*Space, Time and Architecture is intended for those who are alarmed by the present state of our culture and anxious to find a way out of the apparent chaos of its contradictory tendencies.*

So wrote the Swiss Modernist Sigfried Giedion in 1940 (p. vi) introducing the first edition of his pioneering and influential history to the background and cultural context in which modern architecture and urban planning grew and flourished. He stated there that:

*History is not a compilation of facts, but an insight into a moving process of life.*

In the Charles Eliot Norton Lectures Giedion gave at Harvard University in 1938-1939 he endeavoured to bring some order and understanding to the development of Modernism in the context of the great buildings and cities of the world, even as many were being blown to pieces in Europe during the Second World War.

Eighty years later, as the destruction of great monuments of civilisation continues in very different parts of the world, we are using this special issue of the Architectural Science Review, as a modest homage to the significance of his great work. We are also exploring ways out of the apparent chaos of the contradictory tendencies of our own age. The following papers focus on how architectural solutions relate to the people they serve and the places they are built in now and how they will perform in the different future we are so much better able to predict today. At the heart of these papers, and the challenges they address is the huge shift in the balance of power that has occurred since Giedion's time in the three-way dialogue between client, designer and users. Most of the architecture described in Giedion's 1941 book deals with the grand designs and ideas of great architects. Even when humble dwellings were described, the discourse was mainly concerned with the visual impacts of the ambitious

sculptural planning and architecture of a scheme or the huge leaps and bounds offered in the mass production potentials of new construction systems. People are seldom visible in his figures, despite the functionalist imperatives promoted in the book, and ironically, it is at a human scale, that post-war architecture so often failed. Many Modernist buildings and estates, notably concrete brutalist structures around the world, have been abandoned or demolished. An obvious defence is that they were built very quickly, in untested forms and materials due to the pace of the industrial innovations happening and the need to rebuild devastated cities and rapidly erect homes for the millions of people dispossessed after the war. By comparison, the drive for short construction periods today is all too often related to a desire for increased developer profit. Issues of the long-term durability of structures, places and communities are still widely ignored by designers and their clients.

The notion of Space in Giedion's book appears to have been synonymous with the perception and understanding of architectural form, emphasising the sculptural qualities of buildings and cities, so well reflected in the then popular idea of buildings as *frozen music*. Time then was largely related to the historical context of a building and its date, set against the contemporaneous ethos and aspirations of its constructors.

Vernacular buildings were generated very differently. Rather than being inspired by new design ideas, or as reflections of the glories of a single age, or author, they evolved over centuries and millennia in the particular places, climates and cultures that worked to shape them via numerous iterations and enhancements over time, and were shaped by them in turn. Thus, performance problems were gradually ironed out and opportunities for improvement implemented using simple design changes in orientation, solar and wind harvesting and protection, useful energy storage, occupant behaviours and lifestyles. The beauty afforded by the shapes of building elements and their decorative motifs were developed using local materials wrought, cherished and embellished over centuries. Much of the essence of local

cultures around the world, manifested in such local design wisdom and skills of the many, have been forgotten in the relentless march towards industrialised construction methods and their economic benefits, often accruing only to the few.

In the following papers the re-introduction, in some cases, the introduction of local design wisdom and skills, is a leitmotif. They show that ideas of how to achieve progress in the built environment can be couched not only in cultural terms, but also political ones. Some authors present solutions that are best implemented via slow moving, top-down political systems, while others advocate development that is managed using much finer grained, bottom-up processes generated within local communities themselves that can rapidly be adapted as circumstances change.

In the architectures of Europe after the second world war, fast construction speed, in conjunction with the huge scale of change, inevitably came with a high risk of failure. The relative merits or problems of different structures, styles, systems and standards were often not regulated before they were adopted in the headlong race to build more. These were cases that, tragically, were only deeply reflected on when catastrophes occurred: part of a tower block blew out, flat roofs failed or whole buildings burnt. But many buildings failed not just during extreme events, but also washed up by the tides of time. Cities around the world are now littered with empty 1960s and 70s office blocks that are simply unfit for purpose, while in parts of London post-war pre-fab houses are still standing and hugely popular with their occupants.

How could this happen? Did nobody keep watch to ensure that the super-tanker of the built environment was steered towards a more 'sustainable' future? Apparently not and that is disturbing when we currently face pressures for rapidly construction, new ways of reducing cost, new demands for more from less. The papers that follow not only focus on how to steer the build environment, but recognise that a rapid pace of change can be used in self-healing

systems as well as self-wounding ones. This issue of ASR addresses head on the concerns of many who are alarmed by the present state of our culture and provides some answers to a number of serious questions we need to deal with like: How best to design for the aged and the urban and rural masses of the poor? How can we reality check designs? How do we create a more genuinely durable architecture for the 21st Century? These are very different questions than those posed by Giedion, but they reflect his imperative to deal with contradiction. Of course, the specific questions of today will differ from Giedion's because, as he would recognise, the world eighty years ago was a very different from the world in which we act.

In 1938, there were around 2.3 billion people on the planet whereas today there are 7.5 billion. In 1940, the Global Mean Temperature was around 0.8 °C cooler than it is today and median summer peak temperatures were typically cooler. Moreover, standards of living for the majority of families in the developed world have soared along with the growth of the middle classes. So, too, have levels of resource consumption, waste and expectations of what people want and need to sustain their lifestyles. In order to manage consumption and development and reduce their damaging impacts on societies, economies and the environment, governments increasingly rely on treaties, regulations and standards to control the system. Inevitably the rate of institutional change and change in practice is far slower than the speed of technological change and product development, not to mention the speed with which settlements can grow and disappear in our world of wars, migration and instant communication. Fundamentally, the powers of control can lag dangerously behind the rates of change, and nowhere more so than in the built environment.

This special issue we have named: Place, Time and Architecture. In doing so we suggest that the notions of *Place* are much more powerful design drivers nowadays than Giedion's *Space*, not least because we operate now with a much fuller world view, and thanks in part to

modern media. At the pinnacles of architecture, the idea of buildings as sculptures still hold sway, but for the majority of humanity issues of how appropriately buildings and communities are design for, and perform in, their different cultures, climates and economies will be increasing preoccupations because those problems will influence their success over time. *Place* replacing *Space* in the title also recognises the fact that ‘international’ solutions much favoured by ‘Modernists’ are decreasingly tenable. The very high energy, carbon and financial costs of the ubiquitous lightweight, over-glazed repertoire of ‘Modernist’ designs are simultaneously resource greedy and lack the ability to withstand the ever-changing bio-physical conditions in which they operate. No doubt some rich and aspiring economies will still promote monuments to the 20th century dream that energy would be too cheap to meter, rendering artificial conditioning systems forever affordable. But even they are seriously questioning this model in light of grid level power failures that can render such buildings and even cities un-occupiable.

New ‘traditions’ are needed now, as old models fail. The authors included here are writing some of the scripts for the development of new those new ‘traditions’ in papers that recognise that for a safer, brighter, future we must CARE and:

- a) **Create** a genuinely low carbon future
- b) **Adapt** to survive in the different climates of the future
- c) **Reduce** the pollution and waste generated by our current consumption models
- d) **Ensure** the health and well-being of all citizens

The authors of this ASR issue on architecture do CARE, and have the potential to make a significant difference to the future of the built environment, we have chosen eleven papers from the 665 papers delivered at the 33rd Passive and Low Energy Architecture Conference held in Edinburgh on the 2nd – 5th July 2017 ([www.plea2017.net](http://www.plea2017.net)). They ably illustrate the depth and breadth of the challenges that our societies face in trying to deal with the socio-

economic realities of our age, in a warming climate. The papers below speak to the paucity of some of the existing systems of control used by governments and also tell of some of the extraordinary emerging visions and opportunities being explored that can give us cause for belief in a different, more interesting and hopefully better future for the many, rather than the few.

### **Place, Time and Architecture: Papers on the growth of new traditions**

Governments have the power to control the built environment through regulations and standards formulated to steer and quality control developments. Cass and Shove, in their paper on *Standards? Whose Standards?* show that in reality the effects of building standards, regulations and labelling schemes as instruments for reducing energy demand and carbon emissions in the market place are complicated. Far from being neutral, standards are operating amid competing interests and ambitions in the market place and the way they are developed and executed, often involve a ‘dark side’ that can in fact drive up energy use and carbon emissions, in contradiction of their stated aims. The insights they provide use evidence from ten case studies of the performance of speculative office developments in London, which point clearly to the need to fundamentally reassess the function, form and development of regulations as effective tools for controlling the performance of buildings.

Sharpe, McGill, Menon and Farren, in their paper on *Building performance and end-user interaction in passive solar and low energy housing developments in Scotland* look at regulations from the other end of the telescope, this time in the UK housing sector. Here changes to building regulations have raised standards for fabric performance, bringing about a demand for affordable, low energy housing. In three new housing projects, each built to a high standard, the results showed a wide discrepancy in energy consumption in different homes, and highlighted poor levels of ventilation, particularly in bedrooms. Performance was strongly influenced by occupant interaction with the systems and in many cases

potentially beneficial elements such as sunspaces were clearly under-performing. The study highlighted that complex interactions between mechanical and natural heating and ventilation systems could work to confound predicted outcomes so that features heavily promoted by regulations, often without any clear evidence base to support them, could drive up the energy consumption and emissions they were designed to reduce. Their paper makes a strong case for continuous reality checking of the impacts of regulations through credible field testing and performance evaluation in use.

Many of the regulations used by governments to control the built environment are based on the notion of 'energy efficiency'. Santos, Samani and Fernandes make a very strong case for understanding how retrograde is the emphasis in strategies on energy efficiency and how important it is to reframe these in terms of *Energy sufficiency in buildings, a synonym for passive and low energy architecture (PLEA)*. Efficiency is inherently associated with the performance of machines, whereas the concept of energy sufficiency relates directly to the performance of buildings and how well they are designed to operate using only the natural energy around them through the physics of energy flows through the building itself. The need for energy self-sufficiency was naturally a core underlying driver for vernacular architecture. The authors explain clearly why it is now vital to go beyond over-simplified, and too often only modelled, ideas of 'efficiency' to actually reduce energy use in buildings in practice through better climatic design. They point out that policy-makers have an obligation to understand the strategic priorities and values of both energy sufficiency and efficiency, in this order, always placing sufficiency first. Sufficiency relates to the long term inherent character of a building based consequent on its location (place), design and construction. Efficiency relates to second level choices about add-on, continually replaced, procedures and products whose expected outcomes are frequently

defeated by ‘perverse’ rebound effects. Yet almost all built environment regulations are about energy efficiency, so they have to change too, and soon.

The Circular Economy (CE) provides a pathway to step change. CE deals with the potential to change our current linear and wasteful resource consumption and disposal models into a more benign circular process in which much waste is recycled and reused for next step products, helping to avoid waste completely. But how and where does it work in reality? van der Leer, van Timmeren and Wandl explain in their paper on *Social-Ecological-Technical Systems in urban planning for a Circular Economy: an opportunity for horizontal integration*, that a major part of the challenge in functionalising a CE is to vertically and horizontally integrate planning and decision making frameworks in the built environment systems, particularly in cities that are the main hubs of consumption, production and distribution of goods and services. The paper explains and references some of the underlying CE concepts and clarifies their roles with reference to planning documents from the city of Amsterdam in Holland.

Cycles of waste and pollution exist very much in the inanimate flow frameworks of our ecosystems, whereas one of the greatest challenges we face today is that of dealing with the demographic time-bomb created by our rapidly aging human populations. The paper on *Designing housing decision-support tools for resilient older people* by James and Saville-Smith includes some extraordinary work done in New Zealand on this challenge from which we can all learn valuable lessons. They posit that ‘aging in place’, rather than becoming institutionalised in residential care, benefits both the elderly, and their communities, and must be prioritised as a policy objective. They have spent the last decade working with older people to investigate issues around housing, ‘ageing in place’ and how older people and communities can be made more resilient, that is, able to ‘tough it out’ and recover quickly from difficult times. To assist with this, they have developed a set of evidence-based

decision-support, housing-focused tools to help older people maintain independence. They demonstrate that robust research needs to also be transformational research. The real test of their research and its outputs must be in the benefits wrought by research in the practice of ordinary people as well as in the shifts in the sectors that should serve them. They detail the non-technical work needed to facilitate older people's housing choices with policy and decision makers as well as architects, designers and planners.

Economic as well as demographic discrepancies also challenge the stability of our social fabric. Major international trends such as the widening gap between rich and poor and the phenomenon of the shrinking middle classes is exacerbating social fault lines in society. Rather than ignoring the problem, some countries are dealing with it by trying to raise the lower strata of society to reduce the rich / poor gap. In their paper *Thriving in the Slums: Progressive Development and Empowerment of the Urban Poor to Achieve Secure Tenure in the Philippines*, Malaque, Bartsch and Scriver reflect on lessons learnt while working with squatter settlements in Davao City, in the Philippines. That work was directed to helping these vulnerable people and communities to achieve legal tenure and to build homes, incrementally, that eventually become compliant with the local building codes. Their case study outlines the resulting progressive development of urban settlements that were analysed in the context of ambitious Filipino pro-people policies that have prioritised the rights of, enabled and empowered the urban poor to build low-income housing. In turn, their slums have developed slowly into sustainable, secure and even 'thriving' urban settlements within the city, giving many hope for the future success of such programmes.

WAN and NG deal too with huge populations of the poor, but this time in regional China. In their paper on *Evaluation of the Social Dimension of Sustainability in the Built Environment in Poor Rural Areas of China*, they show how the social dimension of sustainability is crucial for the success of rural development. However, most conventional

built environmental sustainability assessment tools (BESATs) are developed in very different cultures and deal simply with issues related to the environmental sustainability and building performance, largely of urban dwellers, with little relevance to dwellers in the rural built environment. The authors have developed the social dimension of sustainability assessment method (SDM) for use in informing such rural development that may be of great use to others working in similar areas in their own countries. The tool was designed to be used to guide the practice of successful rural construction from the early design stage. It certainly provides an interesting contrasting focus to the previous paper where bottom-community based initiatives contrast with this Chinese case study where the assessments and guide proposed are more focussed on the centralised provision of construction development.

By contrast, Fosas, Albadra, Natarajan and Coley focus on the challenge of housing burgeoning populations in the refugee camps of the Middle East. In their paper on *refugee housing by cyclic design*, they look at the problem of designing for ‘planned temporariness’, where the build time for a settlement for thousands of families might be only months compared to the years or decades for developments in the previous two papers. They propose a cyclical process for improving such shelters using a rapidly iterative evolutionary process that involves a series of steps being taken including: the thermal monitoring of pre-existing shelters to construct validated baseline simulation models; the use of the simulation models to theoretically improve shelter performance; and demonstrator construction and field testing. Using a case in the Azraq camp of forty thousand inhabitants in Jordan, they demonstrate that significant reductions in overheating within the tents can be achieved using their method, with real improvements in the thermal conditions of shelters within such refugee camps. They also highlight how the limitations of the simulation models mean that it is more difficult to assess the comfort implications of key passive design opportunities involving, for instance, using more mass in their construction and the assessment of the critical importance of natural

ventilation in their design. As such, the tools themselves are to some extent a limiting factor, but what is important is that they can also be evolved, along with the shelter constructions with judicious circular thinking to improve the health and well-being of some of the most deprived peoples of the world, the 6 million currently living in camps and the 25.4 million total number of refugees across the globe today.

The next paper deals with that issue head on and explores to the challenge of making natural ventilation happen successfully, in practice, in hot, humid, climates. In *Open windows for natural airflow and environmental noise reduction*, Mediastika, Kristanto, Anggono, Suhedi and Purwaningsih outline a range of detailed experiments done in their laboratories in Surabaya, Indonesia designed to optimise window design for use in hot humid climates in noisy and polluted urban areas. For buildings in tropical climates, the use of open windows for natural ventilation can not only provide low cost and low energy comfort but also provide thermal delight for occupants. Their team chose a particular design for a top-hung window and tested it extensively in their laboratory at different opening angles and orientations, demonstrating that these variables have little effect on noise reduction. The paper concludes with a discussion of how higher levels of natural ventilation can be achieved, particularly in noisy urban areas. It highlights clearly two important lessons: firstly, that careful and painstaking research is desperately needed to enhance window performance if low cost and low energy is to be afforded in 'energy sufficient buildings' rather than being dependant on energy efficient mechanical conditioning, and secondly, that we really do need to re-design our cities to urgently reduce ambient noise and pollution levels in order to provide safe, healthy, affordable and comfortable indoor conditions for urban populations in a warming world with rising energy prices.

But how can we completely rethink the way we plan whole cities? This is where the genius of the PLEA community steps in with new ideas that could actually lead to genuinely

more resilient cities. Rob Roggema, in his paper on *Design with Voids: how inverted urbanism can increase urban resilience*, raises widely held concerns that currently fashionable eco-urbanism practices often lead to small changes that are insufficient to actually repair failing urban systems. He promotes a more radical approach which maps the ‘voids’, the so far undefined design potentials extant within the urban fabric and uses this mapping as a starting point for the (re-)design of a city. His proposition that if you invert the city to be able to see its development potentials in the context of a different future, rather than simply see the fabric one has to work with today, then resilience can be built from the current ‘invisible opportunities’ that can be revealed through the planning process. Using case study developments, he demonstrates a process to make voids visible which exposes and analyses the potentials, and conversely the flaws, of an existing built environment. That process provides a new starting point for urban design. That paper and that of van der Leer are by academics who were nurtured in the rich thinking ground of the sustainability team at the University of Delft. Their students and researchers start out steps ahead of others because they have been trained for decades to ‘think beyond’ and see their work in the larger context of both time and place. It is important to flag the effectiveness of ‘thinking teams’ here and in the context of this whole issue, largely put together from the work of future facing authors and departments.

Another breeding ground for transformational ideas exists in the University of Strathclyde where Clark has worked for over four decades on the challenge of evolving better simulation tools and modelling approaches. As one of the foremost academics in his field, his paper on *The role of building operational emulation in realising a resilient built environment* presents another step change. He points out that building performance simulation provides a means to assess the performance of a design proposal under dynamic operating conditions within the specific limitations of the performance criteria included in the simulation palette of

the package used. The confounding realities of buildings in use, by unpredictable users in unpredictable conditions, and the adoption of a vast range of different technologies within buildings has exacerbated the gap between the building's designers and modellers intent and its operational reality. Consequently, the resilience of the building as-built typically falls short of its simulated performance. Clark's paper describes the source and nature of this resilience problem and outlines a proposed solution that may well eventually colour the way we model and design buildings. By emulating the responses of a building to future events and conditions he posits that we can by-pass the flawed idea that we can accurately model buildings today, to much more purposefully understand how they might respond to Roggema's future voids of opportunity. Those two papers begin to provide the tools to actually explore how we build buildings and cities that will keep us safe in a very different future. *Place* and *Time* are key to how those futures are envisioned.

But how to make such great step changes happen? How do we build a safer future for all? For all is necessary because no one is going to be safe in a gated community once the masses outside become a) angry enough; b) large enough and c) intense in the quest to break through those gates. If we have control systems that evolve too slowly, managed by those with the *power of control* but indebted, often, to the powers of vested interests who have a guiding hand in writing and shaping those regulations, how can we achieve a better world, a safer future for all? Perhaps through that other form of soft power, the *power of influence*. The influencers are those who use the existing traditional and new media to make change happen in society. There is no better case study of this in the built environment than that of Røstvik in his final paper on *The Mobility Revolution as seen through Norwegian Eyes*. Røstvik has been for decades the solar pioneer of Norway. But it was his teaming up with the radically minded pop star Morten Harket (AHA) that created the extraordinary electric car revolution happening in Norway today. He charts why the order book of one large Norwegian

car supplier, Volkswagen (VW), showed that 70,4% of the personal cars bought from them were electric (BEVs and PHEVs) by March 2018. The goal in Norway now is to have an all-electric vehicle fleet within a decade and he explains how this success came about, and what we can learn from this Norwegian case study on what can be achieved, not by the power of control as exercised by governments, but by the power of ‘influence’ as exercised upon populations of voters.

## **Conclusions**

Why has it been useful to start with the influential work of Giedion in this issue of ASR? Because the contrasts and similarities between his time and our own, shed a different light on the papers here. Each paper highlights the enormity of some of the current barriers we have to overcome to create a more resilient and sustainable built environment, and the wealth of opportunities available for the new thinking needed to underpin emerging traditions in design.

It is clear that by taking, like Giedion, the broader view, the larger effects of national politics, cultural thinking and the changing of circumstances around populations become clearer. By taking the longer view too, forward facing now, not backwards, it is clear that the time for radical new traditions to emerge is now. If the types of inspired thinking that are outlined in the papers above are to have real traction in markets of today and tomorrow, then governments need to change their systems and structures to incorporate circular thinking, and constantly evolving, self-healing and improving building traditions. On one hand, far sighted visionary thinking is needed to identify and exploit the voids of opportunity out of which real resilience can be emulated and designed in our buildings and cities. On the other hand, it is the related evidence-based, future-facing and correct research that will make those future visions happen.

## **Acknowledgement**

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