THE BREEZE BLOCK BOOK

INTRODUCTION
Sam Marshall

Malinowski Residence

"I HAVE AN OBSESSION WITH BREEZE BLOCKS."

I have an obsession with breeze blocks. I don't know why. I usually try to avoid obsessions, as they can soon take over your life. Perhaps it was my mother's love of mid-century modernism that sparked my interest in the architecture of that period. Or perhaps it was because it was a shared interest with my wife. In 2000, just before our first child was born, we spent time exploring Sydney, especially the suburbs built during the 1950s and 60s. The middle of the 20th century was the height of breeze block's popularity in Australia and so, unsurprisingly, it's a signature feature of many of the buildings in these suburbs. I became fascinated with breeze block.

As an architect, the beauty of mathematics, especially geometry, intrigues me. Breeze blocks represent a similar defined set of parameters, in terms of size and material. Within these there are endless possibilities and patterns. Over the following years I photographed breeze blocks, thinking that perhaps others might be interested in an exhibition. Then I discovered Instagram. As a pure gallery of breeze block patterns, my Instagram feed allowed me to



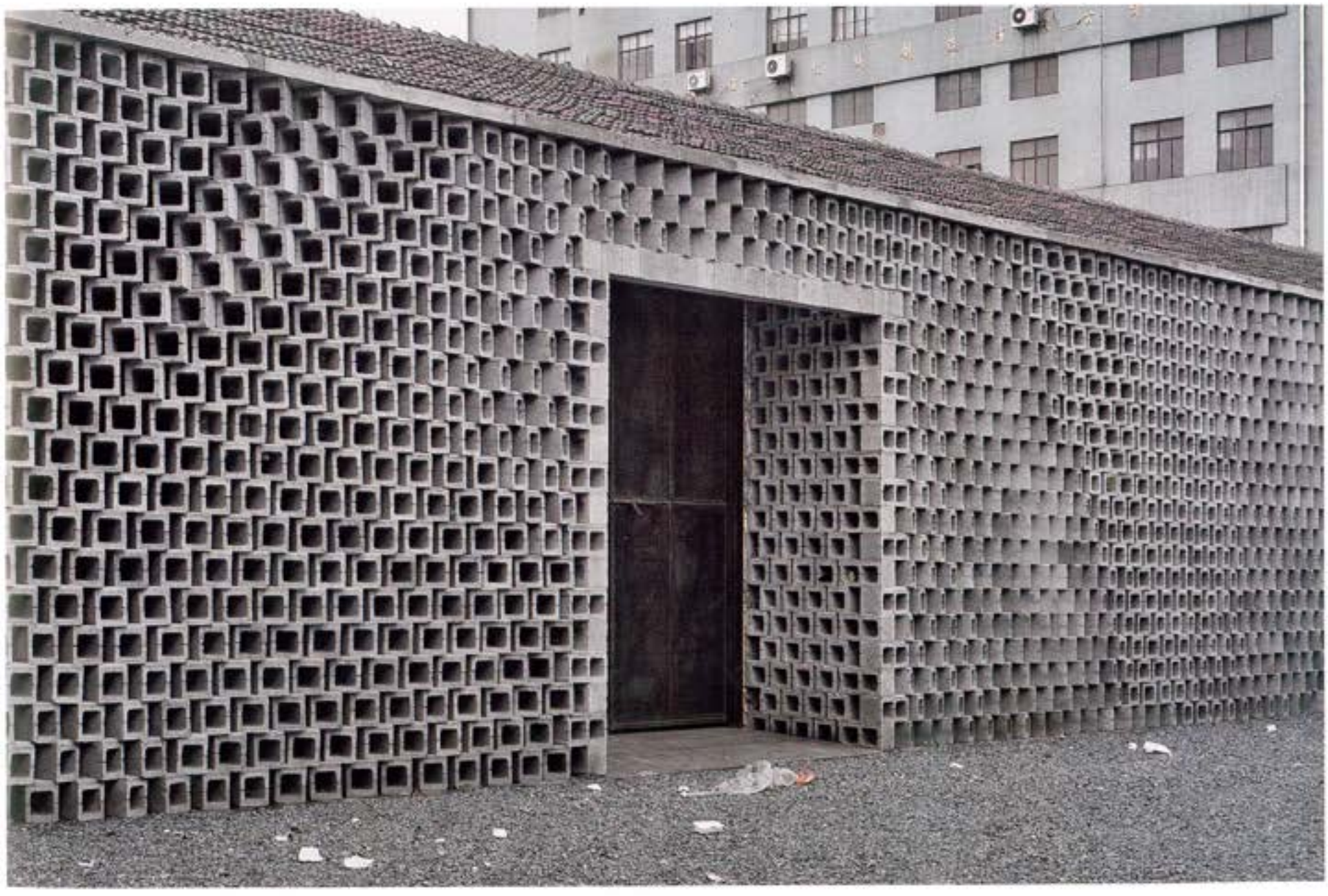


connect to the tens of thousands of breeze block nuts worldwide who shared my passion. Momentum built as I posted not only my images but those of others. I considered the page (@breezeblockhead) everyone's.

From the response, I can see that my fellow breeze block heads hail from diverse backgrounds—nostalgic mid-century modernists, architects, brutalists, breeze block manufacturers, university researchers and students, people from South America in particular and generally people who love pattern. This diversity is in keeping with the history of breeze block and its uptake as a construction material. Unlike raw concrete, whose popularity with architects was never quite understood by those outside of the profession, everyday people are drawn to breeze blocks. They are open, while still allowing for privacy and security, decorative and expressive while still being pragmatic, economical and easy to build with. Breeze blocks offered an accessible modernism. Each unit was a little piece of post-war optimism, which didn't require the skills or expense of an architect to design or build with.

Unlike my Instagram feed, this book is not exclusively focused on the unit of the breeze block itself or its pattern-making possibilities, but widens its gaze to take into account what the material makes possible, architecturally. The joy of pattern is inevitably a part of that exploration, but the projects featured in this book are a far cry from the decorative, often kitsch, ways that breeze block was used towards the tail-end of the mid-century. These projects demonstrate, in fact, that behind breeze block's recent revival, there is a burgeoning reappraisal of their value in shaping the quality of our living environments, internally and externally. Much of this interest seems to stem from a recognition that, in a changing climate, our buildings need to be more resilient—less dependent on mechanical systems for cooling and ventilation, and built to last.

Breeze block undoubtedly has a huge fan base among those nostalgic for mid-century modernism and the optimism of earlier times. But, as I hope this book shows, its real value lies in its ongoing contribution to buildings, which offers a hopeful vision for architecture moving forwards. ■



THE FUTURE OF BREEZE BLOCK: ARTFULLY CRAFTED CONSTRUCTION FOR A DIGITAL AGE

Sam Marshall

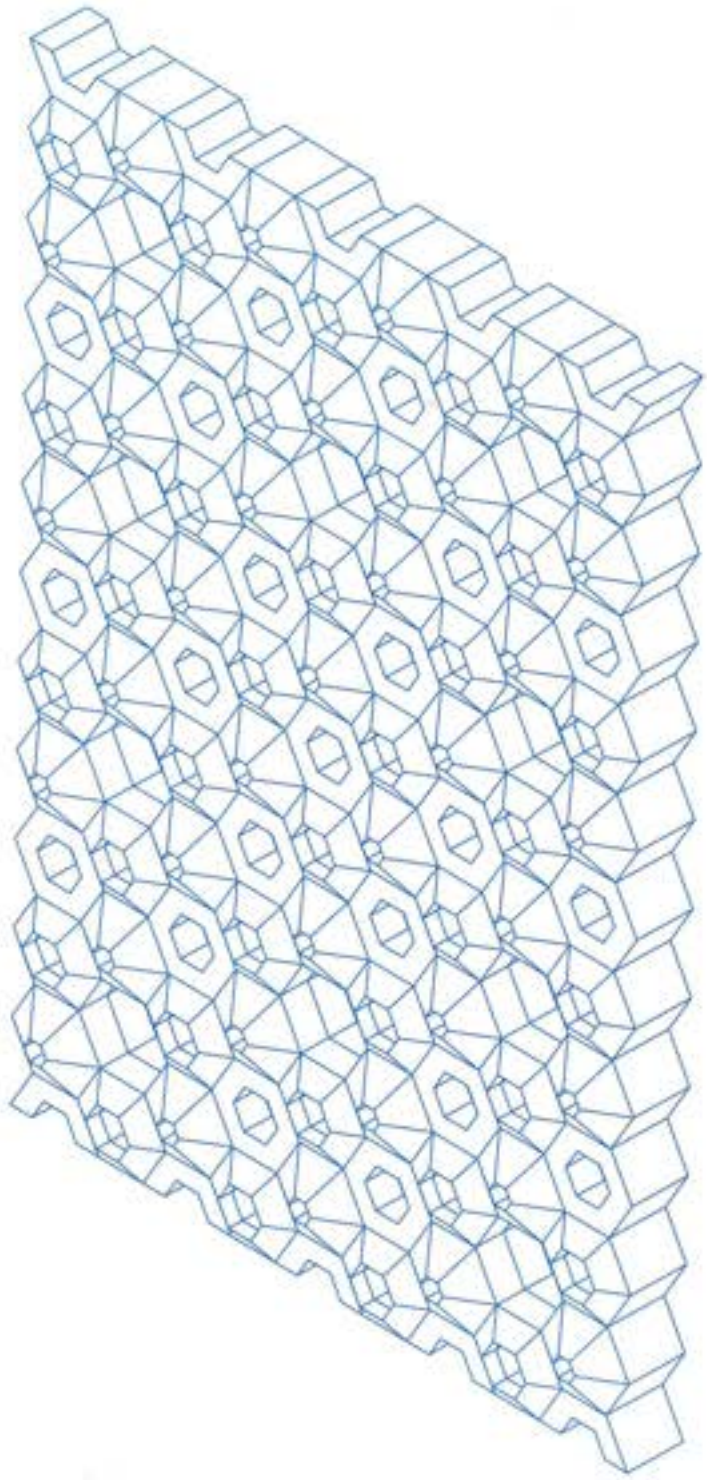
With new materials, new concerns and new technology, where to now for breeze blocks? Progress in breeze block design is likely to come from seemingly opposite ends of the technological spectrum—the silicon chip and handcraft. Creativity and love of pattern bring them together.

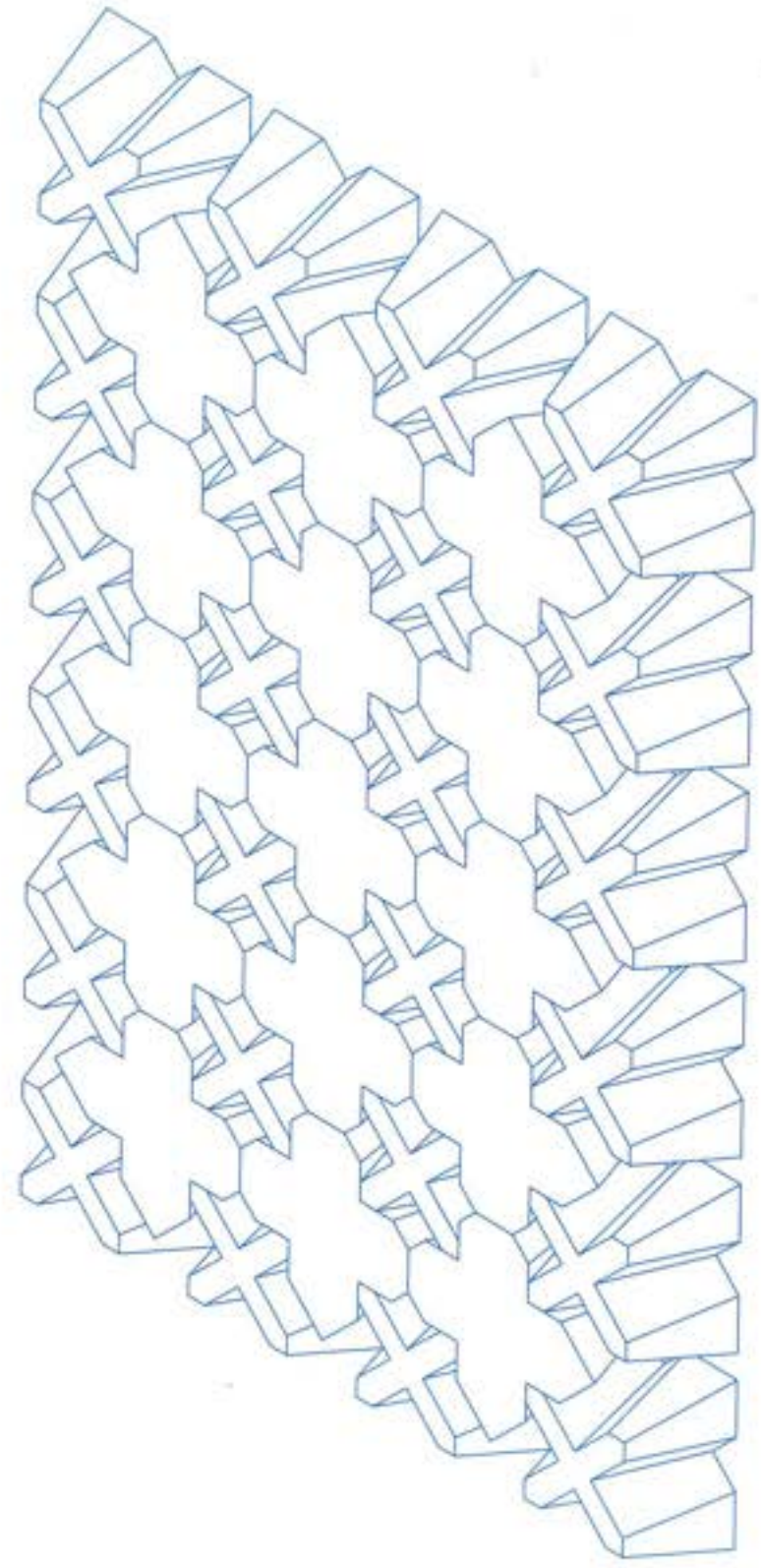
My favourite block falls into one end of that spectrum. The hand-made blocks at the Malinowski residence by architect Oswald Deomede in 1964, where the designer and maker of the blocks is unknown, are to the best of my knowledge unique in the world, and the designer and maker of the blocks unknown. If was to choose my favourite use of an everyday, mass produced concrete block, though, two contenders immediately spring to mind. The recently completed Mermaid Multihouse on the Gold Coast by Partners Hill with Hogg and Lamb (see p164) makes use of simple retaining wall blocks to create new architectural forms, demonstrating that unique expressions with existing blocks are still possible. The J-Office and Exhibition Space in Shanghai by Archi Union (see p34), meanwhile, deploys computing power to generate a complex pattern from a commonplace block.

Countries with low cost labour are able to service the desire for a more handcrafted approach, as a reaction to the mass produced. This often includes casting blocks on site with local materials to any designs. The facade blocks at the Lecture Building at the Alioune Diop University (see p162) in Senegal by IDOM exemplifies this approach, where the use of local labour and materials meant bespoke blocks were possible, in particular an exquisite customised corner block. Usually breeze blocks, being a modular component for walls, do not fare well when it comes to corners but not here.

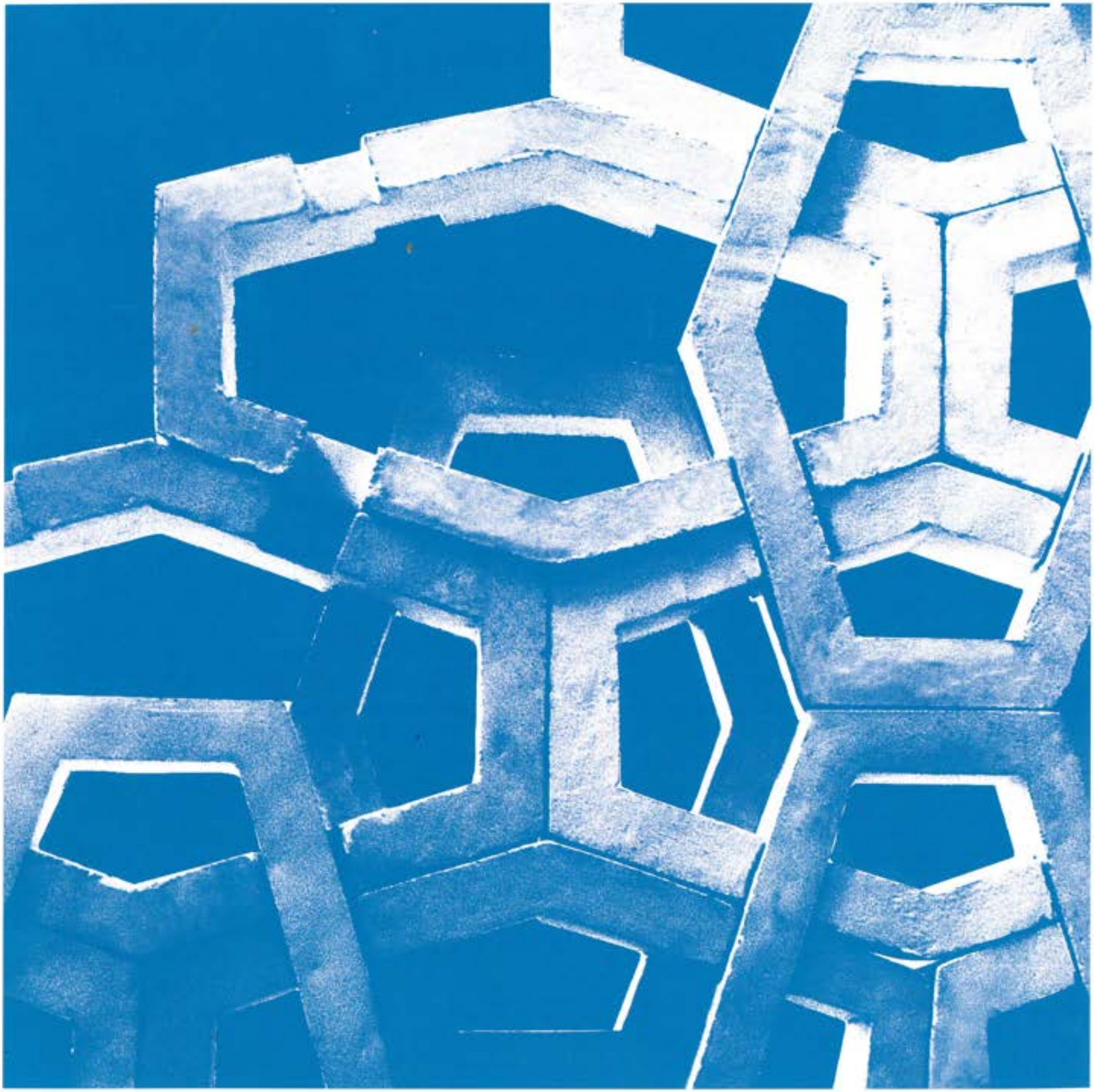
Traditionally, concrete breeze blocks are made by extruding liquid concrete or pouring it into a mould. The high cost of making new moulds has limited the progress of the material and hindered the development of new block patterns. Computers, robotics and 3-D printing are set to change this, just as the materials used to make blocks are set to change.

Parametric objects created by software such as Rhino, Grasshopper and Maya can now be 3-D printed in almost any material, including steel. A new mould can be printed in steel, or blocks can be printed directly. A parametric object has a set of rules that define a three-dimensional object that remain intact while other parameters can be manipulated.





Drawing left—'●' by Florian Schatz, Chin Kean Kok with Koh Teck Wei, Lin RuiJun, Sim Jia Wei Estelle, Wang Suqi Sharry and Yong Wai Kei.
Drawing right—'X' by Florian Schatz, Ben Chan with Kow Xiao Jun, Low Sui Ying, Sherilyn Lim, Zhang Shangyu and Zhi Wenmei.



A parametric cube, for example, will always have eight corners, 12 edges and six faces, but other than that their dimensions, angles, orientation and locations can change. This allows the blocks to be customised, making every block different yet still allowing them to neatly fit together. Alternatively, a block pattern can be unique to a particular project.

Interesting exploration is coming out of architecture courses. In an architectural construction course at the National University of Singapore, students use CAD software to create new block designs, make the moulds and then pour the actual blocks. Tutors Florian Schätz, Corrado Signorotti, Chin Kean Kok and Ben Chan, who facilitate the course, cite that it combines 'traditional principles with new advanced building technologies' and 'cognitive learning by hands-on assignments'. The goal of the course is to find the optimum block in terms of form, sun shading, airflow, tectonics and load transmission. Designs undergo analysis in digital models before being developed with 3-D printer and CNC machines. All in six weeks! The economics of the mass market may prevent these amazing blocks from being made commercially, but little stops them from being used in boutique applications.

At Columbia University's Graduate School of Architecture, Planning and Preservation, Adjunct Professor Trevor Watson runs a subject, Transitional Geometries, which explores abstract tiling principles. This approach allows tiles to be flipped and rotated such that a single tile can create a seemingly random pattern. As an alternative method of creation, new forms are created from iterative mould-making—in each stage experimenting, learning from that outcome, then experimenting again.

Elsewhere, innovative breeze block practices are focused on sustainability: keeping carbon miles down, reusing materials or using waste materials. As concrete can be poured into a mould, many materials can be added to it and not substantially affect its strength

Image opposite—'Hexagons Orthographics' by Florian Schatz and Ben Chan with Chen Zhen Yu, Goh Jia Li, Oh Shu Yi Lisa, Rachel Chng Jun Ying and Wang Zijing.

and durability. After all, the 'breeze' in breeze blocks refers to the waste product from making coke from coal that is used in blocks as a cheap, lightweight filler.

Printing blocks on site substantially minimises environmental and economic costs. Watershed Materials in California has developed machinery that can be taken to a building site to do just that, making blocks from an aggregate of up to 100 percent locally sourced recycled material (such as excavated material, quarry waste or recycled concrete). It uses this material raw without washing or intense processing, reducing the amount of cement in a block by up to 50 percent, to create a block that can be both sustainable and reflective of local conditions.

In Qatar, VegeBlock combines waste limestone and concrete from excavations and demolished buildings with used vegetable oil to create a building block that the proponents believe emits up to 88 percent less carbon during manufacturing.

With 3-D computer programs, architects can design scenarios that transcend the typical stacking construction methodology, creating opportunities for tessellations, nesting and waffling in complex multi element facades. The J-Office and Exhibition Space by Archi-Union Architects uses standard concrete blocks to create astonishing walls that mimic the form of silk. This would have been near impossible to build without a computer to instruct where specific blocks were to be laid. Although set out using the time-consuming method of plywood templates, robotic arms could have laid the blocks to this pattern. If that sounds like the stuff of science fiction, robotically driven construction processes are already finding their way out of university laboratories on to building sites. Australian company Fastbrick Robotics successfully completed the construction of the structure for a three bedroom dwelling in November 2018 using its bricklaying robot, Hadrian X. In 2019, the company plans to build 10 outdoor homes using the technology.

All of this points to the fact that while breeze block is a simple and relatively old material, contemporary advances in design and construction tools hold great promise for breeze block's future as an environmentally responsive, sustainable building material and, of course, its expressive potential. Breeze blocks are cast in concrete, but their potential applications are far from rigidly defined. ■