

TOMORROW'S GARDEN

In the first of two features on innovation, [Annie Guilfoyle](#) looks at developments in materials that could offer a world of possibilities to forward-thinking garden designers

Back in the day, Thursday night was the best night of the week on the box, with our weekly dose of chart-toppers on *TOTP*, and *Tomorrow's World*, a captivating programme that showcased new technology, science and futuristic design. Delving into old episodes online, I watched a feature that originally aired on 10 April 1968, where presenter James Burke reveals the latest thing in garden technology – the polypropylene lawn or plastic grass. As the camera pulls away, it reveals Burke vacuuming his high-rise city garden. It made me question what the show might feature today as the future of gardens and landscape design.

In the world of progressive design, Denmark is one of the global hotspots, so seems like a good place to begin. In Copenhagen, the architectural firm Tredje Natur (Third Nature) has developed a sustainable paving material it calls the 'Climate Tile'. This is being trialled on a street close to the studio, with the backing of the Copenhagen Municipality. The Climate Tile reintroduces the natural water circuit in cities by collecting the rainwater from roofs and pavements, making it a resource and reducing the risk of flood damage caused by rain.

The tiles have holes drilled into the surface allowing the water to flow into a series of vertical and horizontal pipes, which direct the water primarily to areas of planting but can also be linked to the sewer system. This underground pipe system can be adapted for the situation and climate. The roof water can be directed to the plants, whereas the pavement water (which may be salty during the winter) can be directed into the sewer.

The long-term plan is that the tiles will become 'intelligent' via the insertion of high-tech plugs that will read and direct information about the present water level, and facilitate better study of climate change. The beauty of this product is that it requires only surface construction for installation and relatively minimal work and cost compared with major underground drainage development. With increasingly wet seasons and flooding becoming more common, developments like this are likely to come to the fore.

Green energy

Onyx Solar are an international company based in Spain and the USA, and world leaders in the development and production of photovoltaic (PV) glass panels. In 2013, they installed the



“BREAKTHROUGH MATERIALS START OUT ON LARGE-SCALE ARCHITECTURAL PROJECTS, BUT AFTER A FEW YEARS THEY BECOME AVAILABLE FOR DOMESTIC SITUATIONS”

world's first PV walkway at the George Washington University in Virginia, USA. Linking two of the main university research buildings, the solar walkway also features solar trellis panels. The non-slip, walk-on panels have a combined average of 400-watt peak capacity – this is the maximum power that can be produced under perfect conditions – which is enough energy to power the 450 LED lights that are situated below the panels. The company has also produced garden wall panels and handrails using photovoltaic glass, and has a kit on offer for designers to build into outdoor furniture or hard landscaping in residential garden settings. The power generated can be used to power lighting, or charge items such as smart phones via USB.

In 2014, a small town in the Netherlands called Krommenie became the first place in the world to lay a solar bike path stretching more than 100m. The solar cells are sandwiched between layers of glass and mounted into concrete modules. The surface layer has a skid-resistant coating and is tempered to withstand the weight of service vehicles. This pilot programme generates enough electricity to power three households, and there are now bigger follow-up projects being developed in the USA.

There is also huge growth in kinetic materials that generate energy through footfall. Breakthrough materials such as these often start out on large-scale architectural projects, but after a few years they do become available for use in more domestic situations. These products have huge potential and could be applied to various garden and landscape uses; it just needs some lateral thinking.

Material gains

Concrete is the happening material at the moment and is continually being developed with various interesting applications and properties. Self-healing concrete that 'mends' itself is being tested at Cardiff University as part of the Materials for Life initiative; and permeable concrete is also being investigated by several organisations around the world. A UK company called Concrete Canvas is now making a cement-impregnated textile that hardens to form a thin, durable, waterproof and fireproof concrete layer. Composed of a concrete blend and synthetic fibres with a clear PVC backing, the cloth can be manipulated and easily cut to shape, nailed or stapled through and fixed into complex curvatures using basic fixings. Once water is added, the fabric remains flexible for two hours and then sets.

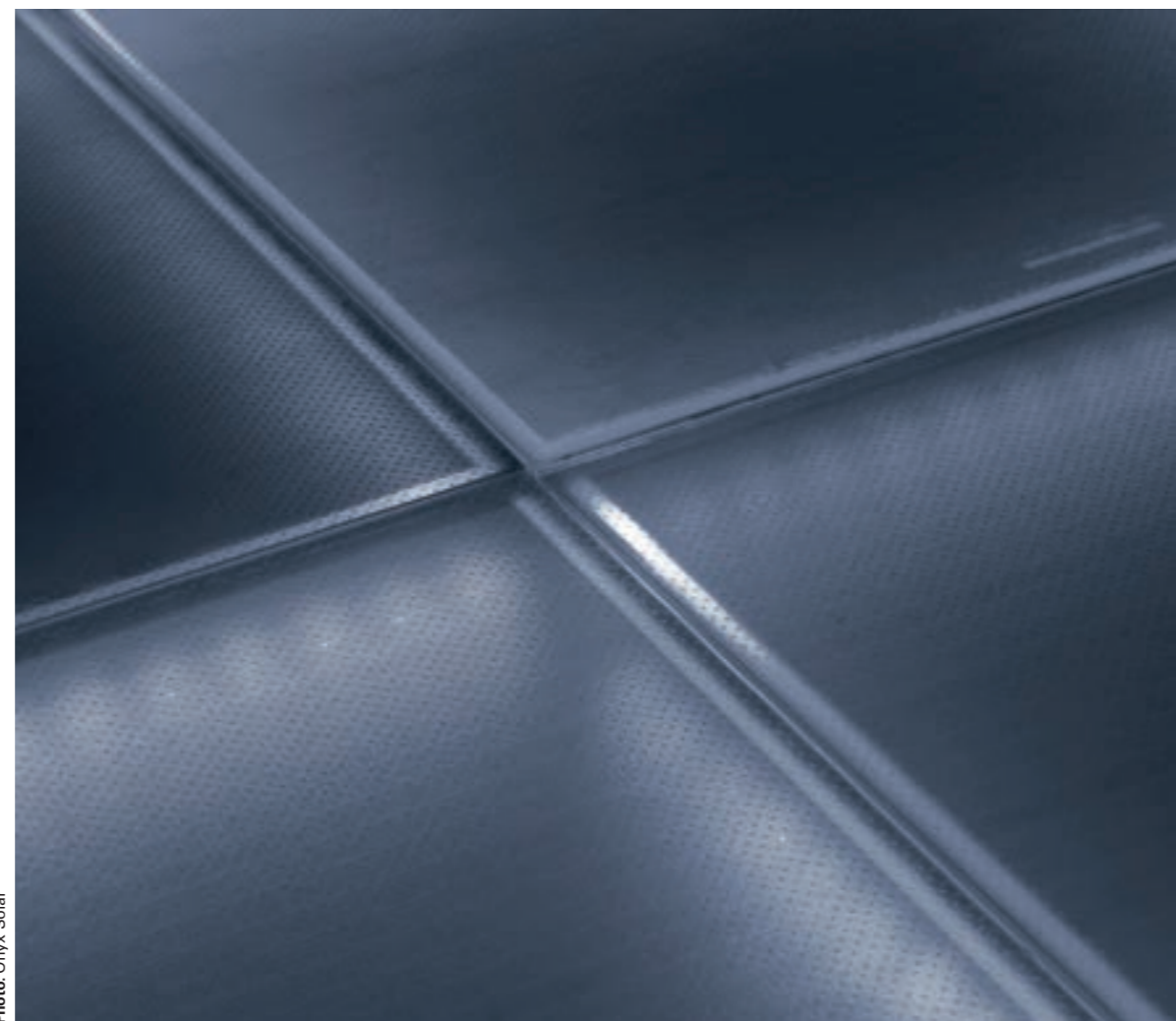


Photo: Onyx Solar



Photo: Third Nature



Photo: Graphic Concrete

TOP LEFT The first photovoltaic walkway, in the US, uses solar cell technology to power LEDs under the tiles
TOP RIGHT The Climate Tile from Denmark seeks to reduce the risk of flood damage
BOTTOM LEFT All sorts of effects are now possible with concrete technology
BOTTOM RIGHT Onyx Solar sell kits for garden designers to create their own solar-powered paving, wall panels or furniture



Photo: Onyx Solar

ELEMENTS OF DESIGN: NEW MATERIALS

Exploiting concrete's decorative potential is a company called Graphic Concrete. Its product and process enables durable patterns and images to be produced on prefabricated concrete panels that can be used for paving or wall façades. Images, patterns and textures can be printed on a membrane with a surface retarder, after which the membrane is sent to the local concrete prefabrication company. Concrete is cast onto the membrane and when the retarder is washed away the image is revealed. Graphic Concrete has a large selection of its own patterns or it will work with designers to produce bespoke designs.

Bright thinking

This year at RHS Chelsea, Pre-Registered SGD Member Kate Gould designed a light-emitting terrazzo for her garden 'City Living', which won a Gold medal and Best Fresh Garden. Gould's approach was to design and make her own tiles in preparation for production. After watching a few YouTube videos, her team conducted some in-office experiments involving modelling clay, several hundred optical fibres and a bag of pre-mixed, rapid-drying cement. When a light source was placed behind the samples, they lit up beautifully, and let a decent amount of light through the concrete. At this stage, Gould contacted stone suppliers Diespeker to help turn the design into a reality. Having worked together to develop moulds and a process for production, they created 28 sq m of light-transmitting terrazzo sections in trays.

Before pouring, some 3.8 miles of fibre-optic cable in varying thicknesses was ordered and chopped up by the team into more than 81,000 individual pieces using various ingenious (and occasionally scary) methods including angle grinders and secateurs. This process took just over a week, using the entire office staff. The different-sized fibres were then weighed and divided by the number of trays to ensure there was an even spread of fibres in each panel. The team then spent a weekend individually poking thousands of fibres into the trays, hitting Diespeker's production deadline just in time.

No one said being innovative wasn't difficult and time-consuming! But it is great to see a designer so actively involved in the design and development of an original material. It shows innovation is not just in the hands of large global companies but can be advanced by creative individuals, just like you, too. ○



ABOVE The light-emitting terrazzo illuminating Kate Gould's City Living Fresh Garden at Chelsea this year **BELOW** Gould's team spent days preparing trays with pieces of fibre-optic cable, to create the completely original material from scratch

Photo: Helen Fickling



FOR MORE INFORMATION

- tredjenatur.dk/en
- www.onyxosolar.com
- www.concretcanvas.com
- www.graphicconcrete.com/en/products
- transmaterial.net/light-sensitive-concrete
- www.kategouldgardens.com
- scin.co.uk