WHERE SCIENCE MEETS ART
MAKING THE FUTURE A MASTERPIECE
behaviours, then we need people to love their stuff, and to hang onto it for as long as it fulfills their needs and aspirations.

More controversially, many would argue that we also need people to get seriously good at resisting the seduction and incredibly creative skills of the advertising industry. After all, billions and billions of dollars are still deployed every year to harness these ‘dark arts’ to drive fundamentally unsustainable consumption.

I only raise these points because the underlying premise in this hugely stimulating special edition is that ‘innovation for a sustainable world’ can be significantly reinforced by science and the arts coming together. More challenging, it asks whether the arts (and culture in general) can help to maximise the potential of today’s scientific and technology breakthroughs for a more sustainable world.

The place where this already being tested is through the design industry. A growing number of design consultancies are putting innovation for sustainability at the heart of their business models. We already know that around 80% of a product’s environmental impact is locked in at the design stage: from that point on, it is incredibly difficult to do anything to substantially mitigate that impact. And we already know that if we’re going to ‘close the loop’ on some of the big material flows through our economy, products have to be designed for re-use, disassembly or even simply recycling right at the start of the process.

In some respects, scientists and engineers have it easy when it comes to addressing gaps in our knowledge, or advancing specific engineering or technology-based solutions. But the science of behaviour change is a big and complicated challenge. Indeed, complexity is a word that pops up time and time in these articles, whenever we’re talking aesthetics or aspiration, psychology or peer pressure.

Here in the UK, for instance, we’re about to embark on the biggest ever roll out of smart meters anywhere in the world, eventually reaching into every home in the country. The technology is really clever, and the potential sustainability benefits over time are enormous. But who’s to say how people will respond to a mega-project of this kind, led by the ‘big six’ energy companies whose track record in engaging consumers leaves something to be desired?

This is such exciting territory! Professional designers are already pioneering all sorts of synergies at the intersection between science and the arts; cutting edge concepts like biomimicry (the art and science of innovation inspired by Nature) have moved from a series of intriguing niches to big businesses worth billions of dollars. And many of the solutions we need can be located in that interface, tapping into the collective genius of both scientist and artist.

Jonathan Pont is Founder Director, Forum for the Future. His latest book is The World We Made.

The creative industries are thriving. In 2012 they were worth £71.4 billion to the UK – not bad from the ashes of the worst banking crisis in its history. It’s a result that legitimises the country’s claim to be world-leading, unlike most other parts of the UK economy.

Beyond the balance sheet the knock-on value generated by the creative industries has been noticed too. Creative innovation, excellence and Britain’s reputation for culture are key drivers of inward investment. The social impacts of cultural activity – education, skills, entrepreneurship, health, and community cohesion and regeneration – are ever-widening spirals of added value. Culture has emerged as a critical net generator of social and financial capital. It embodies value.

These positive externalities are the force behind an international movement to put the arts, heritage and creativity at the heart of the post-2015 Sustainable Development Goals. The recently signed Hangzhou Declaration predicts that cultural and creative enterprise will, in turn, compare with the agrarian, industrial and service epochs that have been milestones in global economic history. Culture should take its place at the heart of policy. “Culture is our most powerful force for creativity and renewal,” according to UNESCO’s Director General, Irina Bokova. In her vision, “creativity is not a commodity – as a source of strength, of values and social cohesion, self-esteem and participation.”

The need for such economic models – prompted as much by climate change as by the financial crisis – has moved culture to centre stage. This is because technological, political and economic solutions on their own will never provide complete answers. The ‘invisible hand’ of culture which got us here in the first place needs to get us somewhere else. The argument goes that by fostering certain values we can live sympathetically with the planet’s capacity to cope. This is contingent on the idea that culture can embody values that support a natural equilibrium.

Can culture help to match our lifestyles to the resources we depend on?

This is an epic drama unfolding fast, and it challenges us personally and politically – as individuals, communities and countries. Only with acts of generally, forgiveness, empathy and a general dredging in common sense will all this be peacefully resolved. The irony is that nature, without us, does equilibrium rather well! Cultural value rests on the premise that culture is a force for good, and that the experience of art which plunges us into other realities – of empathy, community, joy, empathy – can help us solve commensurately bigger issues.

Sustainability, and not just so, is forcing the convergence of these ideas, and so alongside the creative sector’s newfound confidence, the mood music is reflective and gritty, questioning the parameters of value, of growth as it’s currently defined, and whom and what it all serves. Artists are scrunching up the scripts and breaking away from the norms in just the same way that circular thinking is turbo-charging design. Citizen science is pulling down ivory towers, and the ubiquity of the digisphere shows just how rapidly disruptive movements can change everything. This is the stuff of creativity in its purest, surest form; a new cultural age which encompasses the experience of oneself in relation to other; interdependency and diversity; reality and uncertainty, and the embodied state. This is what the Hangzhou Declaration is aiming to embrace in the post 2015 Development Goals.

Julie’s Bicycles is poised at this interface. Working with arts practitioners from all over the world we have felt the desirability, the buzz of culture’s contribution. There’s an easy link between culture and arts, creativity and sustainability, and some superb examples. There is also consensus that sustainability matters and is relevant to art and that creative partnerships can rapidly accelerate positive change. National and international clusters are creating the conditions for scaled, responsive leadership. We have gathered data on environmental impact from almost 2,000 organisations, representing a new value set which we can use to hot-house good ideas, reconfigure how we work together at scale and unite art with broader impact. The creative industries are finding new meaning as they collide with the pressures facing the rest of the world.

However, for a bunch of people who deal with imagination, we are not working nearly intelligently nor fast enough. Too many cultural leaders have yet to recognise how profound and robust this is, and how total a response is needed; too many are still thinking that switching houes lights to LEDs will do the trick. It won’t. We need to dig critically into our core before we can claim that culture has a part in this. Timing is everything. The sooner we muster the purpose, partnership, data, debate, energy and critical mass of creative noise, the sooner we can construct a proper framework for value. Any vision of the future relies on creativity of the highest order, and culture should have a pivotal role.

Alison Tickell is CEO, Julie’s Bicycles. Image: The Pregnant Messenger by David Buckland. Cape Farewell
Jeremy Lovell explores the potential for innovation when scientists and artists meet.

In all probability, artists and scientists share a common wellspring of creativity and then put it to use in radically different ways. But tear down the silos society has built for them and the two are therefore incompatible is coming under increasing challenge.

"Scientific and artistic creativity probably does come from the same well, and then move in quite different cultures and get quite different training. But their interest in ideas and exploring those ideas is deep collaboration between scientists and artists, exploring between trauma memory and the need for a coherent ‘life story’, illustrated through the experience of an 80-year-old watchmaker and war veteran.

The interaction between artists and scientists is by no means a one-way street. Such encounters also open up new vistas for the artists, giving them greater understanding of the mechanics of the world around them.

Sculptor David Buckland’s Cape Farewell is an international non-profit that works in partnership with scientific and cultural institutions to challenge audiences to think differently about our relationships to each other and to the natural world. It has been bringing artists and scientists together for many years and taking them on voyages of discovery. It was one such trip to ‘Solar’ in 2006 that inspired author Ian McEwan’s novel Solar.

For Alison Tickell of Julie’s Bicycle – an organisation which works with arts and cultural organisations to bridge the gap between art and environmental sustainability – the value of such interactions is to take both out of the comfort zone of an established discipline. The result of one of these initiatives is that the creative industries – music, theatre and visual arts – are now able to calculate and act on reducing their carbon footprint, and that exchange between culture and science is an interesting one.

And it is not the only gain. With scientists increasingly (and, in many cases, evidently) uncomfortably in the spotlight on issues as diverse as climate change and health, the need to engage with the public has never been more evident. That, according to Tickell, is where the artist also comes in.

"The creative sector deals with complexity in a way that science just does not. Complexity is often so poorly handled. We have seen that so clearly around issues like climate change. Artists are so much better at handling and communicating nuances", she says.

Despite professional rivalries and jealousies, science is fundamentally a collaborative process, with scientists drawing on and acknowledging the work of others to further and further their own efforts. Their work has no status without peer review. But while they are comfortable engaging with their own kind, they are often less happy or able to communicate to a wider audience.

By contrast, artists tend to work on a far more individual basis – but as the public is their customer they have to be much more focused on communication than simply connecting with their peers.

As the 19th century French physiologist Claude Bernard succinctly put it: "Art is a Science is we.

Artfact, a collaboration now in its fourth year between scientists at London’s Imperial College and artists and designers at the neighbouring Royal College of Art, is putting the two disciplines together to explore this area.

"With increasing emphasis on the need for scientists to engage publicly to explain their research, Artfact is proving quite a valuable outlet for them to start thinking more about how they might start communicating their research and the broader social implications. That is something that scientists do not do so well. They don’t have those conversations as frequently", he adds.

In unwitting illustration of the communication gap, when asked to put forward someone to talk about the science-art interaction, the Royal Society, the country’s foremost scientific body, said it was far too busy.

For Clare Brass, Head of the Royal College’s SustainRCA programme, while scientists occupy one end of the creative spectrum and artists the other, designers are where the two meet most effectively and to practical effect – taking the scientific and technological advances from the laboratory and applying them to the artistic visions of the future to create a practical outcome.

"Because designers are all about deeply understanding other people who aren’t them, they are instinctively going to do what makes people tick", she says. "Designers bridge the gap between scientific concept and artistic abstract, bringing both to conception."

She offers the example of design student Mauricio Alforsso, who has chosen the humble loofah – mostly put to practical use as a bath-time back scrubber but found by science to have some other useful properties – to create a vision of the future. Not only does the loofah possess antibacterial properties, and is strong, light, a good insulator, absorbent, and can be ground to make paper or shaped when wet into other forms, but it also grows like a weed in Alforno’s native Brazil, so might also prove a useful source of income for smallholders.

"Scientists are seeking knowledge for its own sake, not necessarily applying it. Designers take that knowledge, imagine its possible uses and set about creating it", Brass said. "Scientists are good at finding solutions to existing problems, and artists are good at foreseeing and approaching forthcoming problems."

That is something on its own is not going to save us. But the application of technology to build a new and a different future is a great way of going forward. That is what designers do", says Brass.

Jim Dawton, Designer and Director of Great Fridays, sees designers as well placed to lead by turning their visions into reality.

"If you do not create a solution, you will never find the solution. To some extent with art you create something and then you manipulate it, experiment with it and then you get the final solution. There is a component where design does the same thing", he said.

"The artist is the expert, whereas – in today’s conventions – the designer is seen to be the facilitator and the customer the expert. I think the designer needs to step up and re-establish themselves as the expert", he added.

"For some, designers are the embodiment of the interface between art and science. For others, the value is not in integrating the two disciplines but creating contexts where they can spark off each other. Ken Arnold, Head of Public Programmes at the Welcome Trust, believes art and science need each other, and the world needs them in turn to work together, if we are to create a sustainable future by applying vision to knowledge.

"Art and science can’t do it, we might as well give up right here", he says.

Jeremy Lovell is a freelance writer specialising in energy, environment and climate change issues.
Material matters

Conversations across the supply chain will speed the shift to a circular economy, says Duncan Jefferies.

Around 600 million tonnes of products are consumed in the UK each year, and only 115 million tonnes are recycled, according to WRAP. Statistics like this illustrate just how dysfunctional our linear economy – based on a ‘make, use, dispose’ model – has become, and why it’s imperative we replace it with a circular model that recognises the true value of the materials within our products.

A report by the Ellen MacArthur Foundation estimates that the EU alone could save at least £220 billion a year by making the switch, which would also help to address resource shortages, meet predicted increases in global consumption and reduce the world’s CO₂ emissions. But getting to this point won’t be easy. It requires fresh thinking from businesses, designers, manufacturers, consumers and end-of-life specialists: a new mindset that places long-term services above highly disposable products.

Around 80% of a product’s environmental impact is locked in at the design stage. This puts designers in the hot seat when it comes to improving the way materials are used. But designers are often beholden to briefs that don’t allow for creative thinking on material usage. Even when a brief does allow for this, the communication channels that might help a designer to understand the impact of their material decisions down the chain are often lacking.

Similar problems exist at the opposite end of the spectrum, says Rob Misan, Director of We All Design. “A lot of waste management and asset management people are throwing away machines and key materials without actually knowing the value of those components. And that knowledge gap is down to communication, basically.”

“The Great Recovery” is the programme designed to close this gap by allowing designers to connect with networks of scientists, business leaders, academics, manufacturers and materials recyclers. Launched by the Royal Society of Arts (RSA), in partnership with the Technology Strategy Board, the initiative has seen a series of workshop projects held at recovery centres, with the aim of discovering how ‘problem products’ could be better designed.

“One of the things that we hold very true is that the best innovation comes in the intersection between disciplines; when people are encouraged to look differently at a problem from somebody else’s perspective”, says Mike Pitts, Lead Specialist, Sustainability at the Technology Strategy Board.

The workshops are based around a concept of “the fear, the farse and the challenge”, says Sophie Thomas, Co-director of Design at the RSA. Firstly, the fear: designers see how quickly their lovingly researched products end up on the scrap heap. Secondly, the farse: they understand how absurd the current linear model is, one where piles of raw materials are sourced in unethical ways, products are assembled halfway round the world, and shipped from continent to continent before reaching the consumer. And lastly, the challenge: how can they help to improve the situation?

This last point is expanded upon during a series of “break-down” events, when items from the waste mountain are taken apart to expose their flawed design. For example, some LCD TVs contain over 250 screws and require 15 different screwdrivers to dismantle. Or take the example of a spray bottle: a small spring in its trigger can disrupt the plastic recycling process.

Designing for circularity isn’t purely focused on disassembly of course. Longevity, leasing, serving and reuse are equally important concepts for designers to understand, says Pitts. “It’s just not about recycled materials. It’s the fact that we can do all sorts of things inside the loop: making things more repairable, making things re-manufacturable.”

While the first phase of the Great Recovery was about problem definition, the second phase will focus more on problem-solving. For example, Pitts says they intend to “flip” the model established in the first phase and bring life into products – to bring the life cycle in the design arena. A new UK innovation hub will also help to continue the conversations that different stakeholders have been left to now begin.

The Technology Strategy Board has also invested £1.25 million to 35 cross-disciplinary teams to carry out feasibility studies across a wide range of products and processes, and developed an online resource that focuses on design for circularity. Meanwhile, the RSA, in partnership with the Corona Foundation, ran a Future Maker event in June 2013, which celebrated the maker movement and its potential in terms of the circular economy. The strength of this event, according to Thomas, is that it brought together “people from all different ages [and backgrounds], so you had the fashion people, and you also had entrepreneurs, school students – all talking about things, and each learning from one another”.

When it comes to the youngest generation of creative people, the great thing, she says, is that “you don’t have to teach them about sustainability because they’ve grown up with it, they get it, they get social impacts. So actually it’s more about how to utilise that.”

It’s a point that Alison Tickell, Chief Executive of the Arts and Disability Forum, echoes. “Organisation aims to make sustainability intrinsic to the business, art and ethics of the creative industries. A recent series of conversations and events on environmental challenges, under the banner Sustaining Creativity, has explored the drivers for change in the creative industries, as well as opportunities for fresh thinking. Artists and other creative industries contribute a valuable input to the debate on material use and sustainability, she says: “They can make things desirable as well as producing beauty and spiritual realities. Plays, concerts and festivals, as well as streaming or downloading, use materials in just the same way as any other economy. We are looking at how the principles of circularity can be applied across the cultural sector, to see if artists and organisations can collaborate to build a new creative economy.”

SustArt, a Royal College of Art initiative that aims to inspire, encourage and support students to embrace sustainability in their work, has a similar logic at its core. Students are encouraged to produce innovative solutions to sustainable, often by using recycling materials. At last year’s annual Sustain Show & Awards, which honours some of the best graduates, CCE’s Managing Director, Sue Link, saw how students had transformed found materials into jewellery, and loofah sponge into low-cost soap, or biodegradable packaging.

For an example of the circular economy in practice, artists, designers, businesses and others need look no further than Japan, where individual producer responsibility and a system built on the assumption of collaboration has resulted in a very high recycling rate (98% for metals, for example). Because manufacturers co-own the recovery infrastructure, and keep the proceeds of their recoveryott, it makes financial sense for them to recover them. Hopefully, with support from such of the initiatives outlined above, the rest of the world will soon catch up.

Duncan Jefferies is Assistant Editor, Green Futures, and a freelance writer specialising in technology and innovation.

To learn about The Great Recovery, and be part of it, contact Anna Warrington at Forum for the Future.

www.greenfutures.org.uk

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CCE closes the loop

Coca-Cola closes the loop

Coca-Cola Enterprises (CCE), in collaboration with plastics recycling company ECO Plastics, has dramatically changed the way it sources plastic for its bottles over the last 18 months. A £15m joint venture between the two companies came about after CCE identified shortages in bottle-grade recycled polyethylene terephthalate (PET) pellets. The result is one of the world’s largest and most sophisticated recycling facilities, Continental Recycling in Hemswell.

CCE also guaranteed to buy the plastic produced by Continental Recycling for 10 years – the type of long-term collaboration on which the circular economy depends. The facility, which officially opened in May 2012, is capable of processing 150,000 tonnes of mixed plastics a year, and producing 40,000 tonnes of PET pellets. It can turn plastic from used drinks bottles into new bottles for Coca-Cola within as little as six weeks.

CCE and ECO Plastics claim the plant saves around 33,300 tonnes of CO₂ per year, the equivalent of taking over 15,715 cars off the road. Major UK recyclers like Viridor have also agreed to supply thousands of tonnes of plastic to the facility throughout 2014, helping CCE to fill the loop in soft drinks packaging. “It shows how leaders in the waste management industry are evolving to grasp the opportunities offered in a more circular economy and will act as reassurance to householders and local authorities that the domestic recycling industry is thriving”, says Nick Brown, Associate Director for Recycling at CCE.

He emphasises that CCE is already one of the biggest users of recycled materials for its plastic bottles and cans. “We generally have a big interest in making sure that the material we put out on the market is optimised so that it’s as sustainable as possible. We’re not using any more than we need to, and we have a real interest in making sure that what comes back through the recycling chains is maximised for reuse.”
Dr Tamsin Woolley-Barker explores new possibilities for resilience, inspired by nature.

The Madagascar sunset moth is a spectacular harbinger of a creature. She is found here, on this magical island, and every fibre of her being is exquisitely honed by this special place. You come to visit and study the site, and unexpectedly fall in love with this fantastical moth. You sketch her, trying to recreate her iridescence on paper. You discover that every bit of debris becomes a source of nutrition for something new. You come to visit, designing a community centre in Madagascar to distribute clean drinking water. You come to visit, designing a community centre in Madagascar to distribute clean drinking water. You come to visit, designing a community centre in Madagascar to distribute clean drinking water.

Test of time

Photos: xxxxx

Dr Tamsin Woolley-Barker is a Contracted Biologist at Michael Pawlyn’s studio, Exploration Architecture. He has a talent for translating the patterns and microorganisms evolved through billions of years of evolution into design and architecture. This building is a concept design from Ilaria Mazzeolini’s book, Architecture Follows Nature. Mazzeolini explores the ‘ecotone’ between biology and design. There’s a lovely wild river here, where the greater understanding of nature opens up all sorts of possibilities for our future, but it’s not an easy one to bridge. How can we biologists and designers hope to communicate, with our different vocabularies and mindsets?

“The species of a particular habitat provide valuable lessons for long-term design”, says Mazzeolini. “The trick is to mediate scientific reason and function, through drawings and a process of abstraction.”

This emerging field is biomimicry: the art and science of innovation inspired by nature. And it is the universal language of drawing that often translates this functional biology from the lab to the design table. Drawing has always been an important bridge between biology and art. Da Vinci abstracted his illustrations still thrill designers more than a century after his death. His images teem with seemingly alien life, illustrating beyond the known. Da Vinci’s legacies are curiously compatible and universal language of drawing that often translates this functional biology from the lab to the design table. Drawing has always been an important bridge between biology and art. Da Vinci abstracted his illustrations still thrill designers more than a century after his death. His images teem with seemingly alien life, illustrating beyond the known. Da Vinci’s legacies are curiously compatible with our different vocabularies and mindsets.

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Ernst Haeckel’s exquisite and otherworldly scientific illustrations still thrill designers more than a century after his death. His images teem with seemingly alien life, illustrating beyond the known. Da Vinci’s legacies are curiously compatible with our different vocabularies and mindsets.

“Biomimicry brings exciting new possibilities for technology and design. A device in your smartphone mimics the way the human ear and brain filter and interpret sound. Bird skulls demonstrate structures for a more efficient use of building materials. Consider the vast array of fibres in nature: manufacture at body temperature in watery solutions, leaving no toxic emissions, no waste. Every bit of debris becomes a source of nutrition for something else. This is the circular economy we aspire to build. There’s no reason why we can’t replace it. The renowned biologist E. O. Wilson estimates the total mass of all ants on Earth is roughly the same as that of all humans. But you don’t see them chomping on smog, stuck in traffic, or bathing in their own sewage, now do you? Which goes to show we don’t have a population problem: we’re just doing it wrong. With a little observation, emulation, innovation and organisation, we can sustain more life with less impact on resources. Just as animal skins grow, transform, self-heal and decompose, so can our products and homes.

A pair of Dutch scientists, a zoologist and a microbiologist, the other a concrete specialist, have created a self-healing concrete: when water flows into its cracks, it activates tiny bacterial spores which convert a healing agent into limestone [see GF87, p13]. Other meta materials morph, adapting to changes in temperature and light, amplifying or dampening sound. And what about the humble leaf or algae, which efficiently convert sunlight into fuel? Already, a building in Hamburg is generating heat and electricity from algal photosynthesis in its external walls [see GF87, p7].

Biomimicry can also help us think in systems. Pawlyn’s vision is to transform our linear ‘take, make, waste’ approach so that it resembles an ecosystem, with an endless cycle of nutrients. He gives the Cardboard to Caviar project as an example. Here, restaurant waste is turned into horse bedding, then fed to worms, which are fed to fish, whose caviar is served at the restaurant. Pawlyn’s own Sahara Forest Project uses sunlight and saltwater to produce food, water and clean energy, while regenerating life in the increasingly arid desert.

Our fossil-based industries are crying out for transformation. We’re running out of raw material to feed them, and we don’t know where to put the garbage they produce. The energy they run on is toxic. New possibilities are now emerging like moths from their cocoons. Take out your crayons and your butterfly nets, and let’s get to work.

Dr Tamsin Woolley-Barker is a Contracted Biologist at the Design Table for Biomimicry 3.8, and writes about revolutionary biology.

Watch Michael Pawlyn’s TED talk, ‘Using Nature’s Genius in Architecture’: www.ted.com/talks/michael_pawlyn_using_nature’s_genius_in_architecture. There are at least 30 million great ideas out there, and each of them has stood the test of evolutionary time. As architect Michael Pawlyn, author of Biomimicry in Architecture, puts it, “You could look at nature as being like a catalogue of products, and all of those have benefited from a 3.8 billion-year research and development period. And given that level of investment, it makes sense to use it.”
Any hilltop is enhanced by a wind turbine. The symmetry of the turning blades is as pleasing as knowing they are capturing energy and making it usable. So it seems to me, anyhow. But any discussion of wind power reminds you that plenty of folk find every wind farm a blot on the landscape.

This sharp difference of opinion is a reminder that aesthetics is a powerful influence on what we make, where we put it, and whether we like the results. Knowing that, how can we use aesthetics to enhance the appeal of sustainable design? It is a complicated challenge, because aesthetics is complex: a mix of visceral responses, culture and values that makes something look or feel ‘right’. Our consumer culture seems in thrall to the ephemeral, the disposable and the cute. Qualities like efficiency, durability and fitness for purpose appeal when we buy stuff, at least in theory, but it is easy to be seduced by novelty or surface sheen.

Even when a design is ‘green’, it may not be apparent. You can’t tell that a super-efficient hybrid car will save you a substantial amount of fossil fuel consumption by looking at it: it’s still a car. Reduced material or energy during manufacture is difficult to perceive. And in the past, environmentally friendly design that wore its heart on its sleeve has given some of it a reputation for aesthetic self-denial: not hair shirts for all, but close.

Heart on its sleeve has given some of it a reputation for aesthetic self-denial: not hair shirts for all, but close. The symmetry of the turning blades is as pleasing as knowing they are capturing energy and making it usable. So it seems to me, anyhow. But any discussion of wind power reminds you that plenty of folk find every wind farm a blot on the landscape. This sharp difference of opinion is a reminder that aesthetics is a powerful influence on what we make, where we put it, and whether we like the results. Knowing that, how can we use aesthetics to enhance the appeal of sustainable design? It is a complicated challenge, because aesthetics is complex: a mix of visceral responses, culture and values that makes something look or feel ‘right’. Our consumer culture seems in thrall to the ephemeral, the disposable and the cute. Qualities like efficiency, durability and fitness for purpose appeal when we buy stuff, at least in theory, but it is easy to be seduced by novelty or surface sheen. Even when a design is ‘green’, it may not be apparent. You can’t tell that a super-efficient hybrid car will save you a substantial amount of fossil fuel consumption by looking at it: it’s still a car. Reduced material or energy during manufacture is difficult to perceive. And in the past, environmentally friendly design that wore its heart on its sleeve has given some of it a reputation for aesthetic self-denial: not hair shirts for all, but close.

When the New Designers Commission for the £800 million Tidal Lagoon renewable energy scheme soon to be installed in Swansea Bay, South Wales. Paul Newman of the Brighton course, Bethan Laura Wood, designed the Rough Guide to the Future,Away from household design, major building projects can allow architects to explore an aesthetic that expresses the value of a larger project. A current example is the proposal for the Offshore Visitor Centre for the £800 million Tidal Lagoon renewable energy scheme soon to be installed in Swansea Bay, South Wales. Paul Newman of the Brighton course, Bethan Laura Wood, designed a kind of coherence that product designers and manufacturers need to strive for. Jon Turney is a science writer and author of The Rough Guide to the Future.

The kitchen is often a focus for contemporary design. This can reveal aesthetic barriers to doing one’s environmental duty. A detailed study of how people think about at-home recycling, “Unpacking the Household”, carried out by Exeter University’s Stewart Barr for Coca-Cola Enterprises (CCE), found that recycling routines are strongly influenced by each domestic set-up. Since most houses pre-date regular recycling, a key question is where to collect and sort different types of waste. As the research summary puts it, “participants argued that more space is often needed … they aren’t prepared to compromise the aesthetics of their home to make room for a recycling bin”.

So while manufacturers – and CCE is one – are making their product packaging recyclable, the benefits can remain elusive when the bottles and cans reach the home.

The good news is that knowing this highlights the scope for improvement. Recycling bins are ugly, but they don’t have to be. "We neglect aesthetics at our peril", says Dr Barr: “We’re not being very clever about how we design these things.” They exist in a culture where their contents are still seen as waste for disposal, and something we want to keep separate from our living (or cooking) space. “We want to move to where they are seen as ways of storing material which is on its way to re-use.”

Revising the designs would benefit from co-creation with users: what would we prefer our recycling bins to look like? And it needs to take account of the preferences of different household members. Kids are often the household recycling advocates, so child-friendly designs for the bins would probably help.

Away from household design, major building projects can allow architects to explore an aesthetic that expresses the value of a larger project. A current example is the proposal for the Offshore Visitor Centre for the £800 million Tidal Lagoon renewable energy scheme soon to be installed in Swansea Bay, South Wales. Paul Newman of Juicer Architects explains that the building will be “a beacon for what sustainability represents.” A series of overlapping shelves, inspired by the local oyster-fishing tradition, will create an eye-catching structure which resists the weather. As the building will be three kilometres from the shore, the shells will have to be made of concrete, but the forms will blend with the surroundings while drawing in a hoped-for 80,000 visitors a year who will learn about the massive engineering project below the water. The curves and some of Gehry’s work on the Sydney Opera House, but they have been simplified to allow a more straightforward concrete construction.

The rest of the building’s systems will embody the project objectives, too. “We’ve tried to make it self-sufficient”, says Newman. Lighting, ventilation and temperature control are all configured with that in mind, and as well as recycling from the adjoining turbine plant there will be solar panels on the roof and walls of the turbine gallery. The result should be a gallery space that incorporates a sustainable aesthetic in its own structure in a way that is as inspiring to visitors as the tidal power project it is designed to show off.

Cape Farewell [see also p4] is also commissioning a major sculpture to be sited in or near the Swansea Bay Tidal Lagoon. The artwork, it specifies, should interact with the ambitions and significance of the lagoon.

Aesthetics for aquaponics

The artist Michael Doherty is working with aquaponic systems, where plants and fish are brought into a symbiotic relationship, each providing nutrients for the other: “It’s like a hanging garden”, he explains. “The tank with the fish is at the bottom and the water is pumped up to the top, where it flows down through vessels that contain edible plants. The waste from the fish is decomposed by bacteria and becomes nutrients which the plants need.”

Doherty’s aim is to create such systems in a way that is aesthetically pleasing, drawing on materials such as clay and wood, and working with artists and artisans. He wants to bring this new approach to growing food into public realms in such a way that it will be appreciated, and therefore accepted.

“If it’s beautiful, people will get more excited about it, and it will therefore be easier to integrate within the culture. If all they see is a lot of PVC pipes, there’ll be a lot of negativity. It’s important to make it something that people will want to have in their homes or workplaces.”

I met Doherty in Singapore, during his exhibition at the ArtScience Museum in 2013. “Here, 90% of the food is imported”, he remarked. “There’s a huge disconnection between food and how it is produced. When people here plant a seed and see it grow, and in a few weeks find they have a lettuce, it’s like magic to them. I’m really excited about reconnecting people with the science of food production.” – Anna Simpson
Almost everyone recognises the iconic Coca-Cola bottle, but what they might not know is the transformation that it has undergone in recent years. Today, our most sustainable plastic bottle weighs 19.9g, compared with 36g in 1994; it uses 25% recycled plastic, and another 22.5% comes from plant-based materials. But this is just one stage on our sustainability journey.

We’ve committed to reduce the carbon footprint of the drink in your hand by a third by 2020. Almost half of our carbon footprint comes from our packaging, so we continue to innovate by looking at all aspects of packaging from design, weight and recycled content, to renewable materials and recycling. We need to balance the need and desire to create the most sustainable packaging, without compromising on design and aesthetics.

Today, 100% of the 12 billion bottles and cans we produce every year are fully recyclable, but they don’t all get recycled. We want to increase the proportion of rPET (recycled polyethylene terephthalate) we use in our bottles, but to do this we need more PET returned to us. We can’t solve this alone. If we’re to continue to improve our environmental practices and create the bottle of the future, we must collaborate.

Recognising this, we invested in recycling joint ventures to increase the amount of PET that can be reprocessed locally, as well as increasing the availability and use of rPET. One joint venture with ECO Plastics, Continuum Recycling, has more than doubled the amount of food-grade rPET recovered in Britain.

The key challenge now is increasing recycling rates by encouraging consumers to recycle more of the bottles they purchase. We’ve worked with the University of Exeter to better understand the barriers to recycling at home, and found that recycling is an unconscious habit, but that aesthetics play a critical role. We followed 20 families in Great Britain and France for six months and saw that space, systems and technologies within the home determine how waste is managed, and people weren’t prepared to compromise on aesthetics at home to recycle more. So this year, we have used this insight to launch a recycling challenge with the open innovation platform OpenIDEO, to draw on inspiration from the platform’s 60,000 members to co-create ideas that will help improve at-home recycling habits, and increase recycling rates.

As the science of sustainability advances, the bottle of the future will continue to evolve and incorporate an ever-higher percentage of recycled or sustainable materials. We are already seeing the future become the present, as in 2011 we introduced the Coca-Cola Company’s PlantBottle packaging – the first-ever fully recyclable rPET plastic bottle made partially from plants. The Coca-Cola Company is looking at how it will source materials from other renewable sources to make a bottle that is 100% made from plants. Consumers are undoubtedly receptive to recycling, but the look and feel of the product also have critical roles to play. As we work towards creating the bottle of the future, we’ll continue to innovate – something we know works best through collaboration. By working with our peers, scientists, engineers and designers, and responding to consumers, we’ll create great looking, sustainably-produced bottles.

Joe Franses is Director of Corporate Responsibility and Sustainability at Coca-Cola Enterprises.

Experience tells us the design of a space can affect our mood, mind-set and even our behaviour. Colour, materials, light and texture are all used by designers to communicate a certain atmosphere, and these choices can have both an immediate impact and a lasting one. Take the bedroom, perhaps the most highly personalised and intimate space we create. Exploring the concept of ‘home’, Battersea Arts Centre commissioned artists to create bedrooms in the Town Hall where it is housed. They worked to the concept of ‘playgrounding’, in which the artists and their audiences used the building as a performance space to experiment with its design and feel. Working with the architect Steve Tompkins, ideas are developed collaboratively and tested through a series of low-cost investments. For Artistic Director, David Jubb, it’s a way of ‘trying something out before it’s finished … essentially spending more money on research and development in order to spend less money on the final result’. The final designs have become permanent residency spaces for artists working at the Centre.

The Better Bedroom Initiative, launched by the Design in Mental Health Network (DIMHN), is looking at the bedroom from a mental health perspective, and challenging suppliers to come up with new designs for everything from furniture to flooring and lighting. Design in mental health is about making those environments healing, optimistic and effective places to be. It is ‘not about the best bedroom’, asserts Jenny Gill of the DIMHN: it is about ‘creating an alternative to the institutionalised settings of the past’.

As constant inhabitants of designed space, perhaps more of us need to enter into the dialogue that such critical eye over the spaces we move through, and their impact on how we live our lives. The challenge of efficiency in a resource-constrained world offers a focal point. If behaviour is as important as recycling, and can be altered with simple, low-cost changes to the home, then we could look forward to a healthier, more productive and more sustainable future.

The complex relationship between design and behaviour was highlighted by a partnership study into recycling by Coca-Cola Enterprises (CCE) and the University of Exeter. Associate Professor Dr Stewart Barr asserts that the design of a kitchen can provide the spatial architecture for managing waste in a very effective way, or it can be a real barrier ... if you have a kitchen that allows you to separate waste properly, for example, then it’s more likely to happen.”

Participants suggested they weren’t prepared to compromise on aesthetics to accommodate a recycling bin. In rooms where only one bin is available, such as a bathroom, it is less likely items will end up being recycled, especially if waste is perceived as ‘dirt’. It’s ideas such as this that CCE hopes to see through its recently launched recycling challenge, which uses the open innovation platform OpenIDEO, and invites individuals to submit ideas on ‘how to establish better recycling habits at home’.

The question is whether design should inform behaviour – or whether behaviour could, and should, inform design. Dr Barr believes, “You need to give people the opportunity to change their behaviour, and in certain instances that means changing the design and architecture of spaces.”

But what about spaces further beyond our control? Office design has changed considerably over the last century. The enclosed room has given way to open-plan, with the aim to value and facilitate unplanned encounters and conversations. Google attempts to “encourage casual collisions of the workforce”; others provide altmeals for staff to grow their own vegetables.

However, a 2013 US and UK workplace survey conducted by the design and architecture firm Gensler found that offices have gone too far with the concept of open-plan, adversely affecting productivity. Janet Pogue, a principal at the firm, believes companies should “create work environments where workers can shift between various work modes”. This flexibility is especially important in schools, where pupils need to be able to work privately and collaborate in equal measures. School design has come a long way since dimly-lit Victorian classrooms, where the windows were built deliberately above the line of sight to discourage daydreaming. A Salford University study, carried out by Professor Peter Barrett and his team for the architectural practice Nightingale Associates, found that the academic performance of a child in the best environment could be 25% better than an equivalent child in the worst classroom environment.

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The interaction of performance art, research, architecture and design has the potential to move theories on effective spatial design forward. If anywhere can benefit from ‘playgrounding’ as a technique, schools surely can.

Ben Alcraft is a freelance writer, specializing in renewable energy and sustainability.
An interactive theatre performance about river system management is, perhaps, understandable, unlikely to drum up much enthusiasm. But a show that allows you to create your own music festival? Now, that sounds fun. And this is the show an Australian-based theatre company, Boho Interactive, finally opted to create after reviewing a Healthy Cities report at UCL Australia. The performance, based on systems science and inspired by board game-style interaction, has three parts: participants create a festival, discover the consequences of their decisions as they move closer to triumph or disaster, and then learn the reasons why.

"People like this mix", says the show’s writer, David Frinigan. "Systems science is not necessarily intuitive, but we found that rather than teaching people, we were saying ‘this concept is really familiar to you’. Our hope is that this follows through in how they make decisions about the world.”

The performance is so successful that it has been commissioned by the London Science Museum, reaching audiences on the other side of the world, and is extending into the corporate world as training for the board of an Australian bank.

The benefits of merging these two very different worlds are becoming increasingly recognised, especially when innovation is needed. Alison Tickell works to encourage sustainable practices with real-life festivals. Originally from the music industry, Tickell founded Julie’s Bicycle in 2007 because of her frustration with its “clumsy” approach to the environment. She says: “The creative sector has a long history of questioning the status quo and promoting environmental awareness as part of our cultural values. It has the potential to shift the norm, at scale.

And yet this potential is largely unrealised. Tickell puts the disinclination down to the fact that 98% of creative companies are SMEs, predominantly focused on survival. “They don’t see themselves as having a significant voice in the environmental conversation. People still ask: ‘What has this got to do with us?’”, says Tickell. She believes that the key to changing that attitude is reinforcing the concept of ‘value’: one that both artists and audiences are particularly open to.

But a concept on its own isn’t enough. Tickell adds, “It’s about creating the context in which people are confident to act, and you do that with evidence.”

The first thing she did through Julie’s Bicycle was to commission the Environmental Change Institute at Oxford University to create a carbon baseline for the music industry, over the course of a year. The second was to create a working group of senior music industry, over the course of a year. The second was to create a working group of senior music

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An essential resource guide from Julie’s Bicycle:

Practical
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Great Recovery: www.greatcharity.org.uk
Green Arts Marketplace: www.greenartsmarketplace.com
Julie’s Bicycle: www.juliesbicycle.com
Media Greenhouse: mediagreenhouse.co.uk
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