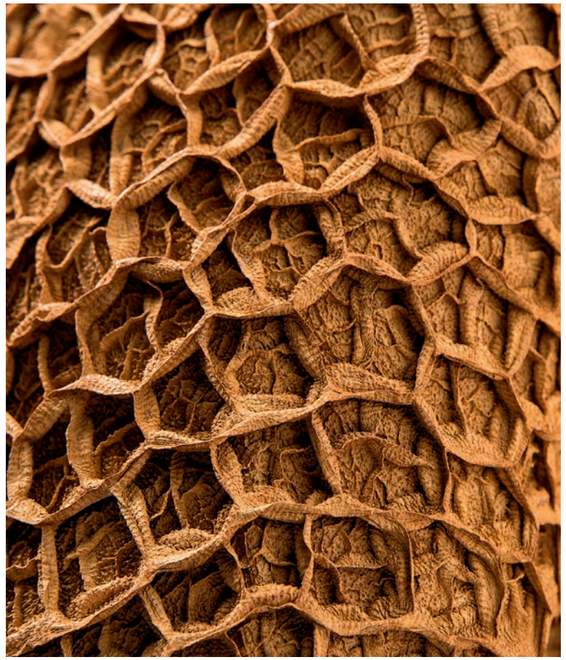

FOOD FOR THOUGHT

With food waste and over-production a growing concern, a new generation of makers is tackling the leftovers and transforming them into desirable, recycled products. *Debika Ray* takes a look at some of these innovative projects

'The 20th century was the era of physics. The 21st will be the era of biology,' says Catherine Flood as she shows me around *Food: Bigger than the Plate*, an exhibition she has co-curated at the Victoria and Albert Museum. Part of the show presents work by makers who are resisting the drive to simply create more stuff, choosing instead to allow the materials that are available and over-abundant to shape their output – in this case, the by-products of food production.

Crafting with food waste addresses our growing concerns about the impact of humans on the planet. While the shocking estimate that 1.3 billion tonnes of food are wasted every year highlights the need to ensure everything edible is consumed, much of what is currently produced by farms is neither fit for consumption nor used in other ways. A new generation of makers is attending to these neglected raw ingredients, transforming them into recycled, renewable, organic, durable and aesthetically sophisticated materials to replace the synthetic or specially cultivated ones we depend on daily – tackling the mountains of rubbish we generate in the process.

These groundbreaking experiments chime with a growing public interest in the provenance of our possessions, which materials expert Seetal Solanki says bodes well for their mainstream adoption, paving the way for a more sustainable cycle of production. It's clear that the work of these craftspeople is not only an important and timely intervention into the food cycle, but encourages us to question what and how we consume. But the field is not without philosophical quandaries. 'A lot of these designers are trying to address the problem of waste, but it's a double-edged sword,' says Solanki. 'They are creating a desire for waste products, so are they also creating a demand for them?'

I spoke to designers working with food waste, many of whom are featured in the V&A show, about their challenges and opportunities and how, in rehabilitating waste, they are tackling the challenge of making the unappealing desirable.

IMAGES: © BILLIE VAN KATWIJK. LEFT: MATERIAL DISTRICT

Above and right: from Billie van Katwijk's *Ventri* collection of leather made from cow stomachs

MEAT

‘I saw cow stomachs for the first time in a market in Italy, boiled and presented on ice,’ says Amsterdam-based designer Billie van Katwijk. ‘I didn’t know what they were, so I found them fascinating and beautiful.’ What emerged from that encounter was *Ventri*, a leather made from a part of the animal that’s generally thrown away. ‘Personally, I don’t eat meat, but as long as this industry is there I don’t want to ignore it,’ she says.

About 150 billion farm animals are slaughtered every year for food, and the body parts that don’t make it to our plates and can’t be used in animal feed, fertilisers or non-edible goods – such as lungs, bones, gristle, hooves, skin, blood – end up in landfill or sewers. It’s no surprise that the vegan movement is growing. But with demand for meat expected to double by 2050, animal waste is a problem that’s not going away soon.

It is hard to imagine the demand for cow stomachs ever outweighing our appetite for their flesh, but Van Katwijk is conscious of the ethical questions surrounding her choice of raw material, which she sources directly from abattoirs. She has been cautious not to disguise it in the process of tanning and crafting: the leather, which she has used to make a collection of handbags, is conspicuously intestine-like – mottled, organic and coloured to resemble the stomachs themselves, so as not to give anyone the opportunity to ignore its origins and the questions that come with it.

Does the very concept of devising new ways to use body parts perpetuate the meat industry, or does it make us more mindful of the value of animal lives? By making beautiful objects, are we continuing to aestheticise death or are we simply taking seriously our duty to make full use of creatures that are slaughtered?

Projects such as *Blood Relate* by German designer Basse Stittgen, a series of vessels made from heated, dried and moulded cow blood, strive to problematise rather than highlight the potential of materials derived from animals. ‘One of my questions was: can blood be just another biomaterial?’ he says. ‘I came to the conclusion that by using it, it’s easy to become instrumental in the very industry you’re trying to criticise.’ The collection is designed for display in exhibitions, rather than for sale, often shown alongside a recording of a cow’s heartbeat.

Clemence Grouin-Rigaux, a Master’s student at Central Saint Martins, takes a different stance. ‘I’m not pro the meat industry, but we are going to continue to consume meat for at least 60 to 70 years,’ she says. Her graduation project, *Hidden Beauty*, is a series of personal items – brushes, soap, a comb – made from the bones and skins of a pig, cooked in a water bath, mixed with glycerine, coloured with blood powder or bone char, then dried in moulds. ‘This is a problem of the present, which is impacting our planet – not a solution for the future.’

The ideas pervading this field of design echo those of the nose-to-tail eating movement, pioneered by chef Fergus Henderson. Both take inspiration from a time when animal farming was done on a smaller scale and it was considered good sense to use all parts of a slaughtered beast. This kind of thinking is visible in *374*, a project by British designer Alice V. Robinson, the daughter of a vet. She has created a range of leather accessories – on show at the V&A – made from a single animal, whose meat was also served as part of a dinner at the museum. ‘By working with one bullock, I aim to acknowledge the life behind the products we are so often disconnected from,’ she writes.

A return to smaller-scale farming and a more efficient, holistic system of processing are two potential pathways to minimising the quantity of animal products that are disposed of – and both seem to chime with the ethos of craft and its focus on the bespoke, customised and material-led. The ethical questions surrounding meat production itself, however, are certain to continue.

Left: jacket from Alice V. Robinson’s *374* project, which uses all parts of an animal. Above: Clemence Grouin-Rigaux, *Hidden Beauty*, a series of items made from the bones and skins of pigs. Right: a bag by Billie van Katwijk made from a cow’s stomach

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FRUIT AND VEGETABLES

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Plant waste-based alternatives to commonly used materials are showing particularly promising results – emerging both as a response to debates over animal wellbeing and the need to develop biodegradable substitutes for what we currently use. In the hands of Nathalie Spencer, fibres extracted from discarded pineapple leaves from London markets have been transformed into 'wool', which she has worked with spinners and weavers to turn into textiles, while Piñatex, a brand launched by Spanish leather goods expert Carmen Hijosa, uses the same fibres to make a leather-like material. Also produced in the UK, Chips Board is a biodegradable material for product and interior design made of non-food-grade industrial potato waste, while Italian company Orange Fiber partners with juice manufacturers in Sicily to create fabrics out of waste citrus rinds.

Working at the other end of the distribution cycle, Japanese designer Kosuke Araki has sourced vegetable waste from markets, shops and his own kitchen and mixed it with Japanese lacquer – or *urushi* – which was historically combined with leftovers like rice or tofu to adjust its viscosity before its use in craft. Meanwhile, Berlin-based Julian Lechner and Atticus Durnell, who graduated from the University of Creative Arts, Rochester, in 2018, are two designers using coffee grounds collected from cafés – the former making reusable cups that retain the scent of coffee, the latter producing a range of tableware, tiles, furniture and lighting, which started as a graduate project.

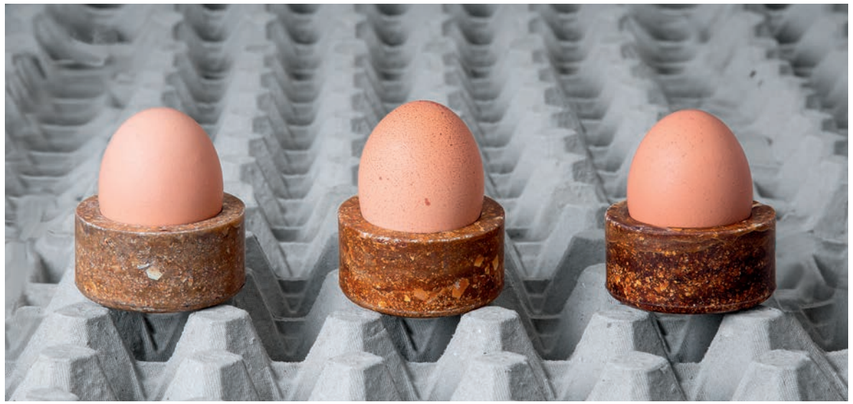
Agricultural production has its own environmental costs, but, unlike the meat industry, there is no suggestion that it should cease, so plant and vegetable waste is a potentially unlimited source of organic material – and an enticing opportunity to replace commonly used plastics and synthetic fibres and develop a truly circular economy. Many of the makers working in this field are already going beyond simply proposing a new way of crafting, and are reshaping processes and supply chains to make these materials more viable. One example is Fernando Laposse's work in Tonahuixtla, a farming village in south-west Mexico, that was hit hard by the arrival of high-yield, genetically modified corn from the United States after the signing of the North American Free Trade Agreement in 1994. Laposse has worked with farmers to develop Totomoxtle, a robust, wood-like decorative veneer made out of the husks of colourful Mexican heirloom corn, with the hope that the extra injection of cash from this product will make it more tempting to plant their native corn. 'It's a very handmade process – we produce everything using rudimentary machinery, die-cutting, stamping, irons,' Laposse says. 'Now we have a system that can be repeated across the country.'

Malai, an initiative based in southern India, is also working directly with food producers – in this case, those using the flesh of mature coconuts. The liquid inside these is too salty and oily for drinking, meaning that every day a processing unit can throw away 4,000 litres, causing drain water to become polluted and soil acidified. Malai produces a leather-like material made from bacterial cellulose grown on this water. With a soft sheen, a variety of weights and naturally dyed reds, browns and blues, it has been used to produce bags, accessories and shoes. 'We started by developing a system with a few coconut processing units. Now we work with several and have a microbiologist taking care of the process,' says Slovakian designer Zuzana Gombosova, who co-founded Malai with Susmith Suseelan from Kerala.

At present, they are focused on stabilising their existing production chain, but have an ambitious vision for the future. 'We imagine a decentralised production system, where you have small manufacturing units in proximity to coconut-processing units or plantations,' says Gombosova. At the same time, they are seeking to grow demand. 'We work with an array of clients, ranging from individual designers and makers to companies. It's particularly nice to work with people who have a sensitivity for craft, who can develop skills for this new material.'

Clockwise from left: leather-like handbag made by Malai using a material grown on waste liquid from mature coconuts; Atticus Durnell's range of tableware using coffee grounds; Totomoxtle, a decorative veneer by Fernando Laposse made from the husks of Mexican heirloom corn

MILK AND EGGS



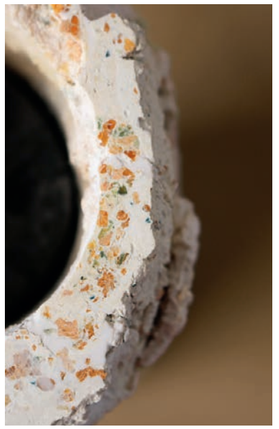
Over a trillion eggs are laid every year by 6.4 billion hens, Basse Stittgen points out. His latest project, *How do you like your eggs?*, is a series of egg cups made of discarded eggs – the albumin protein within the shells binds when heated up to 200 °C and put under 5 tonnes of pressure, the same method he used with blood (see page 29). 'The material is actually stronger than the one from blood and you can see traces of what it's made from, which is nice. I like the idea of using the waste from the egg to make an egg cup, from which you then consume the egg.'

The chicken-rearing industry is not problem-free, he observes, but he sees potential in the mountains of shells it generates. 'I've been reading papers that say they have found a way to pulverise the egg into particles that are so small they can be added to certain types of polymers to strengthen its structure.'

Meanwhile, the use of milk in craft and design is different from these other food groups, in that there's no reason that drinkable milk should become waste. Yet at least 116 tonnes (16 per cent) are thrown away around the world each year, while daily production is growing rapidly, leading to a global surplus and price decreases. 'Overproduction and continuous price drops have seen our appreciation of milk sink to an all-time low,' says Amsterdam-based designer Ekaterina Semenova. Her *Care for Milk* collection of ceramic tableware is decorated in brown and cream glazes made from leftover milk collected from households – an attempt to restore the value that milk had before its mega-industrialisation. Different types of milk yield different shades, but all give the surfaces a matt, caramelised quality.

London-based Tessa Silva-Dawson is also working with leftover milk. For her *Protein* vessels she has used casein, an alternative to plastic extracted from milk protein in a 19th-century technique that's similar to cheese-making. 'I don't think it would be an appropriate material for mass production,' she says. 'It would be better if farms had such a tight loop that there wasn't any waste at all, but as it's happening now I am inserting myself into that system, drawing attention to waste streams that go unnoticed.'

Her method of working explores the possibility of a return to a more small-scale and localised form of making food, materials and products that might become increasingly attractive and necessary in coming decades, as we seek to minimise air miles and overproduction. 'I source the material and make it all myself. I'm trying to bring attention to alternatives that can be found within local communities, instead of having to order materials from the other side of the world.'



Clockwise from left: ceramic tableware from Ekaterina Semenova's *Care for Milk* collection; Basse Stittgen's eggcups made from discarded eggs; bowl and detail of a vase from Tessa Silva-Dawson's *Protein* series using casein

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FISH AND SEAFOOD

Cape Town-based designer Jade Ruijzenaars's *Crangon Crangon* ceramics are glazed using the shells of shrimp, which comprise up to 70 per cent of their bodies. The effect of incorporating these into glazes varies according to the other ingredients used, but the qualities of shell remain visible and the calcium residue leaves a whiteish sheen, creating textured surfaces that resemble the ocean itself. 'To be clear, my ceramic shrimp glaze is not a solution to the waste issue,' Ruijzenaars says. 'The amount needed for ceramic production is in itself far too small. However, *Crangon Crangon* can play an important role in explaining the story of the shrimp industry and reducing the distance between the consumer and our food system.'

Dutch artist Marian Bijlenga's use of fish scales in her intricate, wall-based sculptures is another light touch, artistic intervention that makes use of a material that would otherwise be ignored. She found the scales in a fish leather tannery in Iceland, a byproduct of a process that is already a byproduct. 'The first experiments were with combinations of dried seaweed and fish scales,' she says. 'Then I started with wall panels made from these fish scales, stitched with a sewing machine on water-soluble fabric. I tried dyeing experiments with silk dye, water-resistant ink, henna and even lacquer with the dried sap of the acacia tree, which goes into the damaged parts of the scale.' In her artworks, scales hover as if by magic, suspended by barely visible thread.

Meanwhile, for her *oCO2 Leather* project, California-born designer Andrea Liu has been experimenting with fish skin, employing traditional tanning techniques from Alaska and elsewhere. Fish skin leather is now common, but Liu's interest is not in the desirable whole skins, but the damaged scraps that emerge from the fish-smoking process. 'It's like a different category of waste – very holey, with a kind of *wabi-sabi* effect,' she says.

Working with this has called on her craft skills. 'I found weaving to be an effective way of working with this material – it's already deconstructed to a certain extent, so why not deconstruct it further, then re-piece it together?' This laborious process of tanning and weaving also had another effect. 'The awareness of how the material came to be triggered a feeling of treasuring every bit,' she says. 'By being committed to using waste, I learned how *not* to waste.'

'Food: Bigger than the Plate' is at the V&A, London, until 20 October. vam.ac.uk

Left and below: *Crangon Crangon* ceramics by Jade Ruijzenaars, which are glazed using shrimp shells. Right and below right: intricate works by Marian Bijlenga using fish scales

RUIJZENAAR: PHOTOS PHILIP GROBLER © THE ARTIST | BIJLENGA: © THE ARTIST