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# ECOLOGIST

JULY/AUGUST

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# July/August 2008

Volume 38, Issue 6

## FEATURES



## COMMENTS





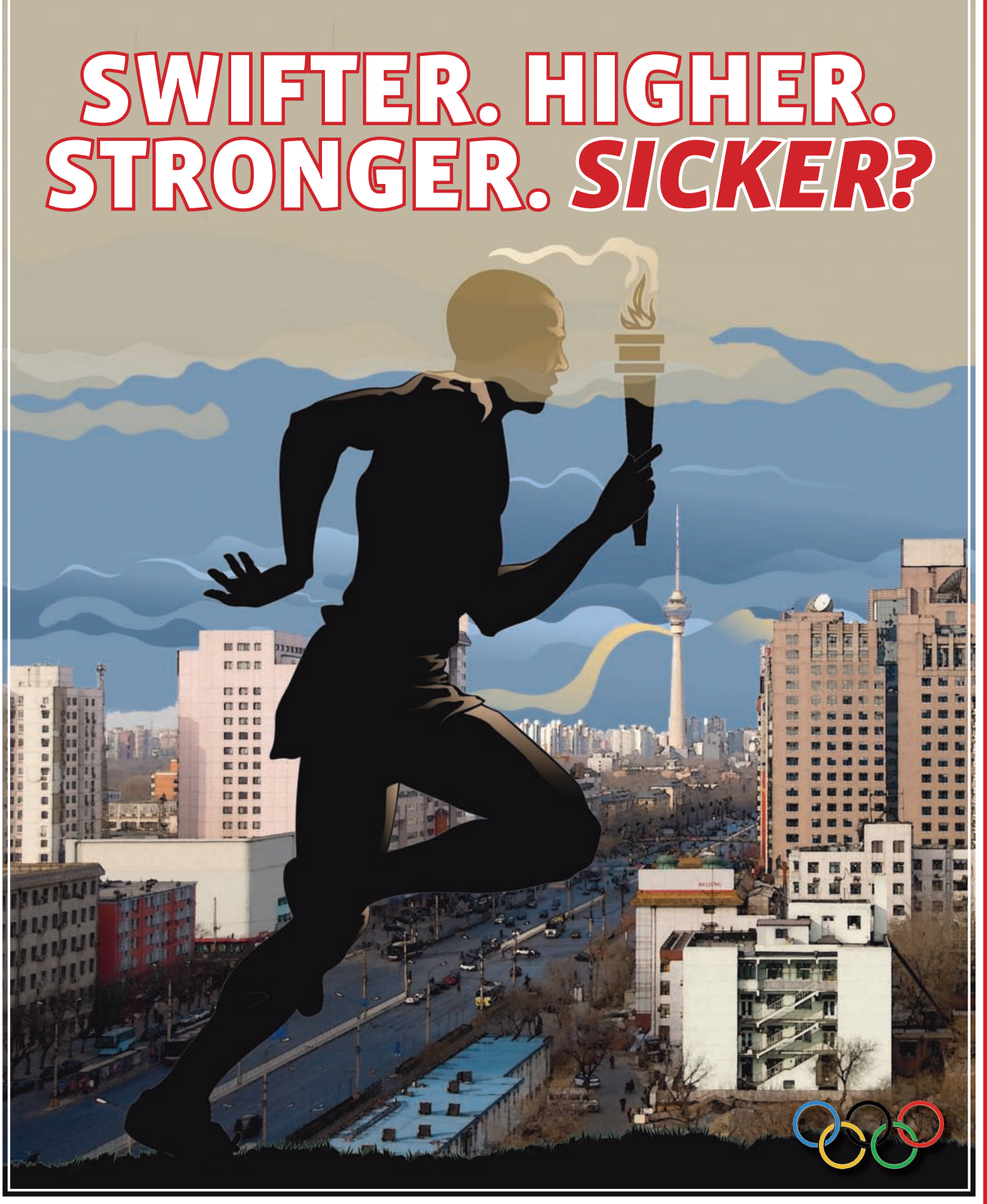


## REGULARS



## GREEN PAGES

# SWIFTER. HIGHER. STRONGER. *SICKER?*



**Beijing has spent £8 billion trying to reduce pollution ahead of August's Olympic Games, but in the run-up to the Games, air quality remains at a 'hazardous' level – as much as five times above the official 'safe' benchmark. In part this is because 30 per cent of the city's pollution, and as much as 70 per cent of its airborne dust, comes from industrialised areas outside Beijing where there have been no real clean-up efforts. Of the 10,000 competitors, 25 per cent suffer from asthma, and the International Olympic Committee, concerned for the athletes' health, has said that some long-distance events such as the marathon could be postponed if pollution levels are too high.**

# Editorial
# Regulation schmegulation

Stop me if you've heard this one before: a natural sweetener with a great taste and zero calories.

That is the promise of Truvia, the latest product to hit the guilt-free-sweetener market. Truvia is made from the leaves of the *Stevia rebaudiana* plant, a native of Paraguay, that has been used for years as a sugar substitute in South America, Japan, China and Korea. It has not been allowed in the EU or the US, however, on the basis of 'insufficient' safety data.

In early animal studies, stevia extracts were linked to liver cancer in animals. They also had the pharmaceutical-like effect of lowering blood pressure and altering glucose sensitivity. The stevia plant is also a source of phytosterols (plant-based hormones) and there were concerns about reproductive abnormalities. But what really kept stevia off the market was a familiar handicap of most herbs – truly natural products don't come with money-spinning patents.

Enter agri-giant Cargill, which has secured the patent for a sweetener derived from a highly purified extract of the plant. The sweetener has been developed in partnership with Coca-Cola, which has exclusive global rights to use it in beverages, and Cargill expects to have Truvia-sweetened products on the market by the end of the year.

The term 'stevia' usually refers to a crude powder or liquid preparation made from the leaves of the stevia plant. Such preparations contain a mixture of components, not just those that give the leaf a sweet taste. The sweetness of stevia comes from glycosides, and while there are a variety of glycosides in the leaf, the two most abundant are stevioside and rebaudioside A – from which rebiana, marketed as Truvia, is made.

How has a product that only a few years ago was subject to US Food and Drug Administration (FDA) import restrictions, and is still restricted in the EU, come so quickly to the marketplace? Frighteningly, under a newer and expedited FDA process, companies are able to pursue a route called 'self-determination of GRAS [generally recognised as safe] status'. This allows for the safety of products to be determined by the views of experts assembled by the manufacturer. As long as the manufacturer can show there are significant published, peer-reviewed studies available in the public domain the product can be given a tentative go-ahead.

Never mind that the dozen studies giving rebiana the all clear were funded by Cargill, and are authored, according to reports, by scientists with some potential conflicts of interest. Some of them are in the employ of Cargill and Coca-Cola, other are members of Cantox, a scientific and regulatory consulting firm that helps get products on the market. Some sit on the International Editorial Board of *Food and Chemical Toxicology*, the journal that published some of the studies. One is a managing editor of that publication.

Cargill defends the research, arguing that rebaudioside A – a different substance from that on which previous stevia studies are based – is safer. Maybe this is so. Maybe it isn't. It seems baffling, however, that approval for a substance that could potentially be used in thousands of products and consumed by billions of people daily could be made on the basis of a dozen studies financed by the manufacturer and reviewed by a team also financed by the manufacturer.

When manufacturers are allowed to sign themselves off on to the marketplace with no real checks and balances, the regulatory process is clearly in chaos. A product that will be consumed by billions should be subject to rigorous scientific scrutiny not only for its safety when taken in isolation, but also for its safety when mixed with other food additives and chemicals; when taken by pregnant women, developing children and the elderly; and when mixed with the types of medications that people who regularly consume sweeteners are also likely to be taking. It is not at all clear that this has been the case with stevia – or rebiana. You have been warned.

Pat

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# Letters

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Email: letters@theecologist.org.
The *Ecologist* reserves the right to edit letters as necessary.

## AND THE OSCAR GOES TO...

I saw your article on the Dhaka tanneries (June) and that the *Ecologist* had set up a film unit with Ecostorm. Might I say the film is impressive and left me feeling angry, sick and disappointed – yet heartened that highly professional footage and journalism is finally becoming more mainstream in the area of eco journalism. Films such as these usually rely on swaths of stock footage and stills, but here you've stuck the camera in the drains and allowed the viewers to smell the disease and devastation being caused.

Congratulations on great work! Really thought-provoking and a cut above most environmental films I've seen.

**Ian Hughes, London**

## THE OFFSET PARADOX

I am what you might call a sporadic offsetter. I do not own a car and mostly get around the city on public transport or by foot. I take the occasional trip within Europe, and when it is not feasible to travel by rail, I fly. With the emergence of discount carriers, it generally costs no more to travel by air. Even factoring in the cost of an offset, flying is still a bargain.

Therein lies a paradox. In a rational market, shouldn't the environmental cost of flying, as determined by the offset, make a few extra hours on a train more financially attractive? And yet because the VER market is subject to the laws of the market, it must be careful not to price itself out. If voluntary offsets were too expensive (fairly priced) there might not be much demand for them, but they might have the power to sway individual choices.

Before reading Jules Peck's article on carbon offsetting (May), I found it theoretically appealing. First, offsetting is one of the rare instances in a consumer's life that makes you conscious of the magnitude of your carbon sin. That weekend getaway to Stockholm is going to cost the planet almost half a tonne of carbon. It puts a quantitative value on the 'think before you fly' plea. Even with no agreement on the amount of carbon emitted per passenger, the numbers are so substantial it is difficult not to feel stirred. It also takes the hassle out of investing in worthwhile projects that might otherwise go unfunded. It is prohibitive for an individual to perform a fair assessment of such projects; I saw it as the role of VER providers to fulfil this function.

I find value in knowing how much my busy little life is impacting the planet – and I would like to be held responsible for it, in some form or other. I think the problem lies partially in the term 'offsetting'. It gives the impression that I can press a magical 'undo' key and erase the ecological consequence of my actions. This is greatly misleading, for as scientists are discovering, ecological changes do not happen gradually. Isn't it possible that the half-tonne of guilt-free carbon emitted on my return flight to Stockholm might be enough to bring the Earth to its tipping point?

**Carolyn Lebel, Paris**

## *Ecologist* poll

**Would you give up high-speed travel to save the planet?**

**45** **per cent** of you would quit the supermarket habit if you had access to a market garden

## GOOD FOR YOU, EU

Jules Peck's article states EasyJet withdrew from offsetting. Odd then that when I booked a flight on 5 May, its website offered offsetting as an option. Naomi Salmon, meanwhile, implies that regulation of food supply is unsurprising because it is a very large industry. On the contrary, I find it somewhat surprising that government is regulating a major business sector where there is a clear need for it, instead of, as too often, kowtowing to 'the needs of business' (which are whose needs, exactly?). The EU is encouragingly less in thrall to corporations, though not entirely blameless.

**Steve Plater, Sevenoaks, Kent**

## THE REALITY OF BLAME

Renée Lertzman seems to have ignored the concept of 'blame' in her comment (June).

Ordinary people have been blamed, almost personally, for using their cars and causing global warming, yet we know that intensive farming, employing fertilisers and pesticides, causes more greenhouse gases than our humble motors, or that London buses and motorway lorries pump out far more noxious fumes than the individual car. Who is to blame?

We are castigated about our wasteful ways – too many lights on, bottles discarded, gardens watered – yet our Government and big business get off relatively scot-free, even though it is, without doubt, big business that pollutes our rivers and air and feeds us a steady toxic cocktail of processed food and dangerous drugs. It is ordinary people who are punished with congestion charges, taxes and numerous daily bureaucracies that merely serve to increase individual stress levels.

I suggest that Renée Lertzman is also in denial, pretending that things are 'not as they are'. The so-called democracies of Europe and the US no longer exist. The ordinary person continues to vote for government that has no power and is, like us, powerless to change the relentless destruction big business generates.

We are not apathetic, merely realistic and tired of being blamed for all the world's ills.

**Lyn Middlehurst, Malmesbury, Wiltshire**

## WOOLY WARMERS

You highlight a problem for hill farmers about wool prices being so low that they are burning it instead (May). Could it instead be used as loft insulation, thus helping with home energy efficiency as well as low wool prices?

**Michael Peterken, by email**

## HIGH COST OF WI-FI

Having researched the possible health effects of phone masts and wi-fi for a number of years, and in light of your excellent report (Dec/Jan), I was appalled to discover my daughter's pre-school childcare centre has purchased a wi-fi-networked computer system in total ignorance of the controversy surrounding these new and largely under-regulated technologies. Our local authority now has a policy to put wi-fi into every school, including primary schools, in our region.

I have stated I will withdraw my daughter from childcare if the wi-fi system is installed, but it looks as if I may also need to develop a new skill in home-schooling if my child is to avoid the impact of electro smog in her formative years. I will, of course, be starting a local campaign to lobby our local authority to revise its policy and would welcome any help from other readers who have successfully lobbied their education authority to remove wi-fi systems. This issue also needs the correct guidance and the application of the precautionary principle at national level, however. I have therefore set up an e-petition with 10 Downing Street calling on the Prime Minister to introduce legislation to require all UK schools to remove wi-fi installations and replace them with wired alternatives. I would be grateful if any of your readers wished to support this call to action.

**Jane Gray, Moffat, Dumries and Galloway**

## FOOD FOR THOUGHT

In response to Tamsin Bates (*Letters*, May), I have worked at Sainsbury's for three years. At Christmas, I wrote to head office disgusted at the amount one store throws away each day. I suggested it could create a composting scheme with local councils, as there is no need to throw away food into landfill. I have sent the same letter every month since. I am still awaiting a response. This a sign not only of corporate failure to address concerned colleagues, but also of a carelessness for the grander scheme of things.

Food that is out of date cannot be sold; it can be offered to staff but the sheer amount of perfectly edible food is too much for one store. To see it thrown into a skip and carted off to landfill is infuriating. Clothes that are missing buttons or just smell a bit funny; TVs that have been returned because they've stopped working – all are put into clear waste disposal bags and thrown into the skip.

Plastic bag use is also unacceptable. More has to be done to wean consumers off them, but the supermarkets should start looking at things they need to do – and fast. It is clear they need to admit and resolve a hell of a lot before they begin guilt-tripping customers.

**Name witheld by request**

## Daily dilemmas

In each month's issue, we ask a common ethical question that many of us ponder in our day-to-day lives, and people can go to our website and offer their suggestions as to how to answer it. In a subsequent issue we will publish the most practical and engaging selections in the letters pages.

**Would you prefer to buy products that are made for remanufacture or products that are made to last?**

Go to **www.theecologist.org** to have your say

## BADGER BLUNDER

According to leaks, Environment Minister Hilary Benn told colleagues he was '*not* persuaded by the science behind badger culls', so might decide *not* to allow more culls – verdict before mid-June reshuffle ! In fact, the current cattle TB crisis is the clearest evidence as to why badgers are completely irrelevant. Cattle-to-cattle spread has been kept minimal since the war by intensive annual testing. The disastrous 2001 foot-and-mouth experiment let more cattle reach the infectious stage, so an explosion in TB both within and between herds spread.

A critically important unrecognised fact is that cattle with advanced TB become non-reactive or anergic to skin or gamma interferon (IFN) tests, so repeat short-interval tests merely remove new cases without finding hidden culprits. They need either a blood antibody ELISA test – like BrockTest – or simply DNA (PCR) tests on faecal swabs (38 million bacilli shed per day).

Ironically, the crisis with the doubling of TB in cattle saw twice the spillover to Old Brock, so why shoot the messenger? Only 1,515 TB badgers out of 11,000 were culled, so hardly a major cause of anything.

**M Hancox, Stroud, Gloucestershire**

## BRING BACK TRAMS

For all the troubles of Edwardian times, transport was not one of them. In 1914, the railway system was at its peak and most towns of any size had trams. Electric railways and trams are a reliable and well-proven technology, and by reopening lines and stations, including local freight facilities, we can restore the happy situation of everyone being within easy reach of a service. Comprehensive rail and tram networks can be restored for considerably less cost than building roads, while small containers, trolleys and pallets give a simple, cost-effective means of transferring goods between trains and small environmentally friendly local collection and delivery vehicles. The roads can be left for light local traffic, safe for pedestrians cyclists and horses.

**Jonathan Dalton, Eastbourne**

### ERRATUM

• In the April *Ecologist* 'Go Figure', the statistic should have read: '1 hectare of solar panels could replace up to 100 hectares of biofuel plantations', not 250 ha as stated. The paper can be found here: http://www.hubbertpeak.com/Patzek/ThermodynamicsCornEthanol.pdf

CLEAN COAL

# AVOIDING CAPTURE

**DON'T BELIEVE THE CARBON CAPTURE HYPE, SAY MPS AND NGOS**

E.ON's controversial coal-fired power station to be built at Kingsnorth in Kent may never be fitted with carbon capture and storage (CCS) technology to reduce its $CO_2$ emissions, despite being 'capture-ready'.

Bob Taylor, E.ON's managing director of generation, was asked by the Government's Environmental Audit Committee whether he was 100 per cent confident that Kingsnorth would one day be fitted with CCS technology. He replied, '100 per cent is a tough test'. When asked what his confidence level would be, Taylor said:

'That is a really difficult question... In reality, until we understand the true economics of operating an integrated carbon capture and storage system at scale, I find it difficult to answer.'

Martin Horwood MP described Taylor's answer as 'raising real doubts about CCS-ready as a claim', and Desmond Turner MP said the market conditions that would make CCS attractive might 'not happen at all'.

Under questioning in the same evidence session, Energy Minister Malcolm Wicks revealed that currently 'CCS-ready' only involves leaving 'enough space' to one side of the power station to build the capture unit, and plotting a route from there to a depleted oil or gas field in which to bury the $CO_2$.

A recent report from WWF, 'Evading Capture', confirms fears that current claims of 'capture readiness' mean next to nothing, and its authors warn that utilities will not undertake later retrofitting lightly:

'Once unabated coal-fired stations are built, the power sector will undoubtedly press for continued operation in order "to keep the lights on", or to demand that the Government pick up the bill for any retrofitting,' said Morgan Parry, head of WWF Cymru.

Concerns were also raised during the Westminster session that the Government is far too reliant on the price of carbon to deliver on its environmental targets. Committee chairman Tim Yeo MP told Wicks that pointing to the rising price of carbon as 'a justification for the choice of the most polluting technologies' undermined the whole concept of emissions trading:

'You will say to people that if you have this system [carbon trading] somehow it will allow them to salve their conscience and get away with polluting as much as they want because somewhere in the world someone will make a saving. I believe that is a very poor argument,' Yeo said.


GREEN ECONOMY

## UP THE WORKERS

If you want a speedy transition to a green economy, get the workers involved. That's one of the messages from the Trades Union Congress in a new report that looks at the requirements for moving to a low-carbon economy.

The report says that there is 'substantial evidence' to show that environmental transitions in businesses happen fastest and most efficiently when workers are involved, but that the UK workforce is currently an 'untapped resource' in the fight against climate change.

The union's call was made as Lantra, the sector skills council for the environmental and land-based jobs sector, warned that a chronic skills shortage could rob Britain of its farmers and remaining self-sufficiency. Figures released by Lantra show that 15,900 workers are leaving agricultural industries every year, with 38 per cent of the workforce now over 45 years old.

Lantra is calling on the Government to make training for land-based and environmental work more widely available.

FOOD PRODUCTION

## GROW BRITISH

The call for increased self-sufficiency in food production was recently reissued in the unlikeliest of places – the Government's Cabinet Office.

Documents seen by the *Guardian* newspaper suggest that the Cabinet Office will shortly call for 'a more proactive and interventionist policy' to avoid the prices for basic foods rising too high, as well as to reduce the burden on farmers. Its report will suggest that relying on Europe to feed the UK is a risky policy because of the anticipated impact of climate change on harvests.

The research chimes with the advice of food policy expert Professor Tim Lang, who recently told the BBC that relying on world agricultural markets to feed us was 'stupid' and 'immoral'.

Asked about the current food crisis, Professor Lang said:

'Maybe it'll all go away, but no-one who watches the food system thinks that it will.'

SCHOOL MEALS

## 'NOT ROCKET SCIENCE'

The days of the turkey twizzler may be well and truly numbered, if the growing movement towards healthy, sustainable school meals is anything to go by.

At a briefing for the Richmond-based School Food Matters initiative, school cook Jeanette Orrey – the brains behind celebrity chef Jamie Oliver's campaign – said that knowing the origins of food was crucial:

'I used to say to other cooks "My shepherd's pie is no different to yours, except that I know where mine's come from"', she said.

Mother and teacher Jackie Schneider ran a food-awareness project in the London borough of Merton – Merton Parents for Better Food in Schools – and said it was just as important to engage parents as children:

## GO FIGURE...

Over **1,000** protected nature areas in Europe are under serious threat from transport infrastructure projects. It takes **one** gallon of oil to make one toner cartridge. **50** per cent of UK farmers say they are already affected by climate change. Squeezing an extra **50,000** barrels of oil out of the North Sea represents **49** seconds' worth of daily consumption. UK sales of Fairtrade products jumped **72** per cent last year. The average UK restaurant dish using non-EU ingredients produces more than **5** kg of $CO_2$ in transport. Local food produces just **51** grams. UK airlines receive a fuel subsidy equivalent to **£9.92** billion a year. Nearly **60** per cent of over 50s surveyed were 'hopeful' when it comes to tackling climate change.


'Parents have become deskilled,' she said. 'We need to work with them, not blame them – they are a generation [that was] sold the myth that convenience food would solve everything.'

The campaign was endorsed by Oliver himself, who made a video appearance to say: 'It only takes a few people to change a school... It's not bloody rocket science.'

**ECO TRANSPORT**

## HYDROGEN TAXIS

Anyone who has cycled behind a London cab will know they're some of the dirtiest vehicles on the road. So news that the first hydrogen taxis will be on the capital's roads by 2012 is welcome.

The black cabs will incorporate both batteries and hydrogen fuel cells, reach 75mph and be able to operate for a full day without needing to refuel.

Although the hydrogen will be produced from natural gas, the cabs will still have a significantly smaller carbon footprint than their diesel predecessors. Lead developer Intelligent Energy describes the taxis as 'a step in the right direction'.

**WASTE**

## PLASTIC UN-FANTASTIC

A key Government adviser has described the campaign against plastic bags as 'diverting attention' from the real issues.

Professor Chris Coggins, who works with Defra on packaging issues, told the BBC that focusing on plastic bags was allowing the supermarkets to pass on responsibility to consumers, when they should be concentrating on reducing food packaging:

'They [supermarkets] have power in terms of what they buy and how it's packed,' he said. 'The problem is, by focusing on the consumer end, they are to some extent diverting attention from what they should be doing.'

Coggins said that plastic bags were a very small proportion of overall waste and oil use.

**RENEWABLE ENERGY**

## COMMON WIND

A cloud of uncertainty has gathered over the future of the London Array, Britain's biggest planned offshore wind farm, since oil giant Shell pulled out its investment in May.

This had led Green Party MEP Caroline Lucas to put forward a novel solution – why not open the project up to community ownership and public investment?

'Linking communities to new wind farm projects through investment could enable a quicker approval process and greater public awareness of the importance of self-sufficient, small-scale energy production,' she said.

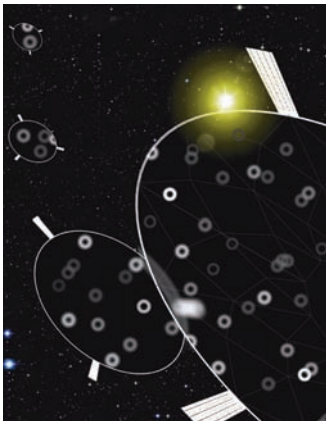
**GEO-ENGINEERING**

## EARTH-FIX FEARS

Is there a sense of climate desperation in the air? May saw renewed media interest in veteran climate scientist Wallace Broecker and his artificial tree, known as a 'scrubber', which he claims could remove $CO_2$ from the air.

Meanwhile, Broecker's Australian counterpart and author Tim Flannery has been publicly musing on the possibilities of artificially cooling the planet by pumping sulphur into the stratosphere, with a caveat that it may 'change the colour of the sky'.

Early spring also seemed to put paid to another infamous geo-engineering project. Scientists at Bristol University have modelled the effect of an array of millions of mirrors placed between the Earth and the sun to deflect incoming sunlight – an idea mooted as a 'last resort' against catastrophic climate change.



Unfortunately, the team found that the mirrors would not simply return Earth's climate to a pre-industrial state. Instead, the tropics would become 1.5°C cooler than before the Industrial Revolution, while temperatures further from the equator would remain 1.5°C higher. In short, less sea ice, less rain and continued acidification of the oceans, say the scientists.

**NUCLEAR POWER**

## SOARING PRICES

It was the cornerstone of the Government's Nuclear White Paper – that the public would not have to bankroll any new atomic power stations. Now a report by Friends of the Earth (FoE) and admissions by the Government's own agencies suggest that the promise will be broken.

In 'Voodoo Economics', former Guardian environment correspondent Paul Brown argues that taxpayers have already underwritten all the debts and liabilities of nuclear operator British Energy, and that by time the first new nuclear power stations appear the industry's liabilities will have increased so much that Ministers will be forced to renationalise it.

Brown also points out that the cost of the Sellafield nuclear complex currently stands at £100 for every UK taxpayer.

The report was released the day after an official from the Nuclear Decommissioning Authority said that the cost of decommissioning the current nuclear plants – currently put at some £73 billion – could rise by 'some billions'.

## SHIP-SHAPE

Fuel price protests by hauliers have drawn renewed attention to www.shiply.com – a website designed to link up haulage companies with people wanting to transport goods, in an attempt to make sure that lorries on the road are always full and not making wasted journeys.

The website provides free listing services and aims to make moving goods easier and greener.

## WATER CHAMPS

Between 16 and 25 years old and keen to make the Big Smoke a bit greener? Waterways charity Thames 21 has launched a 'Waterways Champions' scheme, designed to offer young people the chance to improve neglected London waterways in their local area.

The charity has set up a dedicated website – www.waterwaychampions.org

## PUT PEAK OIL ON THE AGENDA

Liberal Democrat MP John Hemming has tabled an Early Day Motion calling on the Government urgently to review its predictions of peak oil in light of the recent crude and food price increases.

More than 60 MPs have already signed the motion, which is known as EDM 1453. Write to your MP and ask him or her to support the motion.

BIODIVERSITY

# COSTING WORLD WILDLIFE

**PUTTING A PRICE ON NATURE IS NEVER GOING TO BE EASY, BUT DOING SO MAY MAKE US REALISE EXACTLY HOW MUCH WE GET FOR FREE**

Just as Sir Nicholas Stern's report in October 2006 put a price on the effects of climate change, a new report by the UN has begun to cost out the threat of failing to conserve the world's biodiversity – a cool £40 billion annually, and rising.

The Economics of Ecosystems and Biodiversity report (TEEB) is a mammoth three-year project that aims to put a price on the natural world so that the ecosystem services we take for granted – such as clean air and water – can be 'priced in' to economic analyses.

The authors of the interim report conclude that we are currently losing forest ecosystem services that are alone worth €28 billion each year (£22 billion), and that if we continue with projected rates of deforestation until 2050, we will have cost ourselves up to €95 trillion (£76 trillion), depending on how wealthy our descendants are. The loss of other ecosystems will increase this number substantially, and the authors point out that they are making 'conservative estimates'.


The report also attempts to put a price on ecosystem services that we tend to take for granted. It points out that Europe receives ecosystem services from its wetlands worth at least €6 billion every year; that coffee farmers can value pollination by bees at $361 a hectare, and that areas of particularly biodiverse land can yield new drugs and medicines worth as much as $265 a hectare.

The researchers predict that the less-industrialised world, particularly Africa and South America, will be hardest hit, although the United States and Australia will suffer significant financial losses as a result of dwindling biodiversity.

The project's second phase, which will conclude in 2010, is to 'develop an economic yardstick that is more effective than GDP for assessing the performance of an economy'. The lead economist behind the research, Pavan Sukhdev, said that humanity was 'trying to navigate uncharted and turbulent waters with an old and defective economic compass,' and that this was affecting our ability 'to forge a sustainable economy in harmony with nature'.

NGOs welcomed the report, including WWF, whose director of international policy, Gordon Shepherd, described biodiversity as 'the life-support system of our planet,' and called for it to be integrated in all future policies.

But WWF also expressed disappointment with progress made at the UN Convention on Biological Diversity, where the report was launched. The wildlife group said that 'no clear roadmap' had been developed, despite a UN objective to 'substantially reduce' loss of biodiversity by 2010. Criticism was levelled at the lack of targets for reducing illegal logging and the loss of rainforest biodiversity.

WASTE

## SOLAR RECYCLING

Solar panels may give us clean energy but producing them is a dirty business.

So it's good to hear that a group of 17 panel manufacturers has launched a recycling initiative called PV Cycle to deal with the predicted 16,000 tonnes of waste solar modules by 2015.

The industry says that although making solar panels from old silicon costs about the same as making ones from raw materials, the energy needed is just a third of the original process. Recycling also helps provide another source of silicon, which is currently in short supply worldwide.

HEALTH

## DIRTY DIESEL

Is diesel fuel set to become the new 'plastic bag'? A flurry of recent reports and press coverage has confirmed that the particulate pollution released from burning the fuel has serious and long-lasting health effects.

Håkan Törnqvist, a scientist at Sweden's Umea University, discovered that healthy people exposed to an hour of diesel exhaust fumes lost some ability to regulate the width of their blood vessels and the ability to dissolve blood clots. Symptoms lasted for 24 hours.

Separately, scientists at the University of Michigan have shown that exposure to even low levels of fine particulates could increase the risk of stroke, and another team at the Johns Hopkins Bloomberg School of Public Health found evidence for a link between exposure to coarse particulate matter and hospital admissions for cardiovascular and respiratory complaints.

Diesel fumes may even be to blame for the hay fever season. The scientist behind a new study for Kleenex tissues has said that pollen increasingly distributes itself through the air by binding to diesel particulates, instead of to hay particles, which makes it more irritating to sufferers.

CLIMATE CHANGE

## DRY OZ TO STAY

The drought in eastern Australia, which has been blamed for raising food prices, is set to become permanent, according to the Murray Darling Basin Commission (MDBC).

With the water system now controlled at a state level, the MDBC looks set to cut crop irrigation supplies still further, spelling bad news for food prices. Dr Wendy Craik, chief executive of the MDBC, described the prognosis for the future as 'not good'.

AGRICULTURE

## CAMEL POWER

Camels are fighting back against the tractors that had been set to displace them from the desert areas of Rajasthan, India.

The camel population had fallen dramatically following the introduction of agricultural machinery, and by 2005 barely a quarter of the original numbers remained in some areas. But soaring oil prices have forced farmers to re-evaluate the camel as a better long-term investment than a tractor.

A healthy male camel with a life-expectancy of more than 60 years can be bought for around 40,000 rupees (£470). Tractors are at least four times as expensive.

MINING
## VEDANTA ILLS

British mining corporation Vedanta will learn in July whether India's Supreme Court will allow it to mine the Niyamgiri mountain in Orissa. Sterlite Industries, a subsidiary of Vendanta, plans to dig up the bauxite-rich mountain for use in its aluminium refinery at the foot of the mountain.

The plan has met with opposition from a coalition of environmentalists, social anthropologists and the indigenous Dongria Kondh tribe, which lives on the Niyamgiri mountain and regard it as sacred.

The Supreme Court is to rule on complaints against Vedanta that include allegations of illegal logging, road construction in protected wildlife areas and political corruption.

WORLD CLIMATE
## FEEDBACK EFFECTS

Closing the hole in the ozone layer could be a risky business.

According to scientists at the University of Colorado, the gradual healing of the ozone layer over the next 50 years could lead to a warming of the Antarctic.

Using new computer models, the researchers have shown that the current ozone hole actually shields the continent's interior from the effects of global warming by encouraging low-level cooling winds. As sources of ozone-depleting CFCs are reduced, however, the renewed ozone layer could reintroduce seasonal temperature fluctuations to Antarctica and lead to a warming trend with the rest of the world.

Meanwhile in Britain, researchers at the University of Exeter have shown that the sulphur pollution in the tropical northern hemisphere may have helped to increase cloud cover, and hence keep the region cooler than it should have been. They say that reducing sulphur emissions and warming the northern hemisphere could lead to a shift in rain bands, which will reduce rainfall over the Amazon, substantially increasing the risks of drought and rainforest loss.

# NOW THAT'S... PROGRESS

1. Tesco's new CSR report pledges to 'build new relationships'. We're guessing this doesn't include suing Chinese journalists or British broadsheets for writing bad things about you.

2. Nestlé has teemed up with neuroscientists to profile the effect of genetics on taste preferences. This will allow Nestlé to 'meet consumer needs at all ages and stages of life,' it says.

3. Bored of car-sharing? Why not try private jet-sharing, by contacting London's Private Jet Club and making use of its new scheme to get execs to book on to each others' jets?

4. What do you get if you're a cement plant that emits more mercury than anyone else in New York State? An award from the Wildlife Habitat Council for biodiversity conservation.

CARBON CYCLE
## ACID SEAS

The world's oceans act as a giant sponge for approximately half our $CO_2$ emissions, but this comes at a price – ocean acidification.

New research has suggested that ocean acidification is happening much faster than scientists anticipated. Chris Sabine, of the Pacific Marine Environmental Laboratory, said his team was seeing levels of acidification that they had not expected to find until 'the middle to the end of the century'.

Scientists at the University of Plymouth have begun studying undersea vents which belch out $CO_2$. in an attempt to understand what increasing acidification may do to our oceans. They found that although some species, such as sea grasses, were able to tolerate the acidic waters, others, including corals and creatures with protective shells, were badly affected.

Separate research from the Antarctic Climate & Ecosystems Cooperative Research Centre

suggests that low-lying islands may be placed at increased risk of storm surges as coral reefs, which act as wave-breaks, are killed off by the rising acidity.

POLLUTION
## MERCURY RISEN

The US Food and Drugs Administration (FDA) has admitted that mercury fillings are toxic, after years of claiming there was no risk from dental amalgam.

In response to a court settlement with dental campaign groups, the FDA was forced to admit that the fillings 'may have neurotoxic effects on the nervous systems of developing children and fetuses', and they should be treated with caution by pregnant women and those sensitive to mercury or with 'existing high levels of mercury bioburden'.

The *Ecologist* detailed the impacts of mercury fillings in its June 2008 issue.


## A STEELY GAZE

Environmental groups are calling for swift action against the world's biggest steel producer, ArcelorMittal.

In a report presented to the company's shareholders, the NGOs accuse ArcelorMittal of a string of offences ranging from allegations of switching off pollution-control equipment to fatal on-site accidents. The company has 'a global reputation for prioritising productivity over the environment, communities and fair labour practices,' the campaigners say.

The report's central concern is that the company has been given an easy ride by world governments. It states that in most cases, 'decision-makers are reluctant to put meaningful pressure on Mittal to raise its standards', and that souring relations with the company is seen as 'extremely controversial'.

The coalition says low-interest loans are consistently offered to the company, and accuses former British Prime Minister Tony Blair of assisting the company in a takeover of a Romanian state-owned steel mill.

Read the report at http:/tinyurl.com/6c8dzj

# Crude cupidity

A decision to allow the destruction of an ancient woodland suggests the UK's environmental policies are crumbling at the first hint of oil, says **Sarah Lewis**

The rolling hills of the South Downs are to become the latest victims of what may be the UK's last great oil rush. With the price of oil peaking at $135 (£68) a barrel, even the smallest reserves are becoming hugely profitable, and oil companies have begun cashing-in on an area known as the Weald Basin, encompassing Hampshire, Surrey, Sussex and Kent.

Markwells Wood, an 11-hectare ancient woodland on the Hampshire-Sussex border, is in an Area of Outstanding Natural Beauty (AONB) within the proposed South Downs National Park. Despite this, West Sussex County Council (WSCC) recently granted planning permission to Northern Petroleum to spend three years prospecting for oil and gas there.

The application received scores of objections, most notably from the council's own ecology and landscape departments.

WSCC ecologist Don Baker made an 'ecological objection to the placement of a drilling rig within ancient woodland', quoting the local planning authority's own guidelines that it 'should not grant planning permission for any development that would result in its loss or deterioration unless the need for, and benefits of, the development ... outweigh the loss of the woodland habitat'.

The council's landscape officer, Veronica Craddock, also lodged an objection, stating the ancient woodland 'is the most valuable landscape type in terms of biodiversity and should be protected at all costs'.

Further objections were received from Chichester District Council, the South Downs Joint Committee and the Woodland Trust, on the basis the plans were against both Government guidelines and local planning policy, which states National Parks and AONBs can be used for oil exploration only if the potential benefits outweigh the destruction.

However, it seems the need for the last few drops of black gold does outweigh the need for conservation, as seen in the 2007 white paper 'Meeting the Energy Challenge', which states we must 'maximise economic recovery of the UK's remaining reserves of oil'.

WSCC planning committee chairman Mick Hodgson says 'a very strong presumption in favour of allowing oil exploration... comes from central Government for energy security and economic reasons.'

It is thought 200 million barrels lie under the Weald Basin. Optimistic studies suggest Markwells Wood may yield 10 million of them, less upbeat ones three million. With UK oil use at 1.87 million barrels a day, that's less than a week's supply. Yet the record price of oil makes this haul worth a potential £680 million.

But whether all this is more valuable than protecting the area's unique ecology, as per the guidelines, has yet to be shown. Hodgson seems unconcerned. 'It wasn't even brought up in the meeting how much oil is available,' he says. 'Nobody knows until someone has tried to find out. I'm sure the applicant has done sufficient homework. I'm not an expert in oil – I know virtually nothing about it.'

He also said the committee had visited the site and the oldest tree was only 40 years old. 'We decided the woodland was not as important as the oil exploration,' he says.

The Woodland Trust branded Hodgson 'ignorant' and questioned whether he had read the environmental reports. A spokesperson says: 'Whether it looks it or not, this is ancient woodland... wooded since the last Ice Age. When the original trees were taken out in the 20th century the soil went into stasis. It is filled with ancient spores, insects, vertebrates, fungi, all things with an ancient heritage. It is one of the most complex ecologies in the UK. If you took away the trees it would regenerate into ancient species, but it relies on being undisturbed. If you take away the soil it is gone forever. The council are ignorant in not looking at the detail.'

Although WSCC insists nothing illegal has happened its decision flies in the face of conservation efforts. The worry is this will set a precedent, and where this year one hectare of AONB will be destroyed looking for oil, next year the whole forest will disappear as finds are extracted. Indeed, Markwells-1 will be the third oil site in that region, with one two miles to the west and another six miles to the east, all in AONBs. Hodgson does not seem too worried about further digging; neither does he think Northern Petroleum will have any problems getting additional planning permission to do so, saying 'If they do find oil then they will extract it.'

And this is only the first of several wells. Plans are being drawn up to drill at least four sites across the Basin over the next 18 months; UK-wide the Government is offering a record 97 licences for onshore oil and gas exploration.

At a time when conservation and investment in alternative energy sources are supposed to be top of the agenda, allowing the south of England to become peppered with nodding donkeys seems a dramatic swerve in a perplexing direction, yet all signs are showing this is just the beginning.

Photography: SANDY SAUNDERS /WWW.THEWALKZONE.CO.UK

**Sarah Lewis is the 2007 London and South Environmental Journalist of the Year and editor of Sussex ethical lifestyle magazine Rocks. See www.rocksmagazine.co.uk**

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LAND USE

# Foresight without vision

Who decides how our land is put to use? With food security and energy crises on the horizon, the Government's new think-tank needs to pull its socks up, says **Simon Fairlie**

'Food security will bite more quickly than global warming.' That was the first public pronouncement in December last year from Professor John Beddington in his new role as Government chief scientist. One of his first responsibilities is to head the Foresight team – the Government's scientific think-tank – as it carries out a study on the future use of land in the UK.

'We have a limited amount of land, but an increasing number of demands upon it,' said Beddington, launching the project. High on the list of competing land demands are food for humans, feed for animals, forestry, housing, amenity, wildlife – and the newcomer that has disturbed the balance: biomass energy.

The Government's belated recognition that food security is a concern comes as a welcome change after years downplaying the issue; years characterised, for example, by the undermining of the protection once afforded to 'best and most versatile land' in planning policy, and by the conversion of a large slice of Britain's agriculture infrastructure to industrial or amenity use in the name of 'farm diversification'.

The reason for the Government's sudden interest in land use is not hard to determine. Over the last year the price of agricultural commodities has doubled, causing a mild panic among those whose forecasts were based on the assumption we would carry on indefinitely paying £60 per tonne for our wheat, less than we currently do for firewood. The rise in grain prices is partly due to their use as low-carbon biofuels, which suggests that worries about food security stem from our fear of global warming.

Welcome though this new concern may be, it is not clear how much the Foresight team will be able to offer in terms of a response to a future crisis. Foresight's brief is a narrow one. Its minimalist, six-word mission statement is 'to increase UK exploitation of science', and a recent performance review decided too much of its attention had been devoted to 'social and market trends' and that 'the programme needed to refocus on science and technology'. Scientists can usefully tell us, for example, that it takes a lot less farm-grown calories to satisfy our desire for meat than it does to meet our need to drive everywhere; or that a monoculture plantation produces more fuel than a biodiverse woodland. But in a world increasingly reliant on renewable energy, any decisions we make about land use will inevitably be grounded in personal and political preferences: do we value our meat more than our mobility, or our warmth above our wildlife?

On top of this, there is the contentious matter of access. If food security, and hence land use, become as urgent an issue as climate change, then our ecological footprint, calculated in hectares, will come to assume as much importance as our carbon footprint, in kilos of gas. But there is a crucial difference between these two measures of ecological behaviour: the atmosphere is owned by no-one. We all share the air we breathe; it is a global commons. Even if some people buy the right to pollute more than their fair share of atmosphere, nobody can fence off their own little portion and say 'get off my cloud': the whole lot has to be managed collectively.

> Even if people buy the right to pollute more than their fair share of atmosphere, nobody can fence off their own little portion and say 'get off my cloud'

Most of the geosphere, by contrast, has been privatised into separate plots owned by individuals, corporations or governments, who have a considerable, if not absolute control over how land is managed and who has access to it. Any think-tank concerned with land use in a world where land is scarce will have to address this matter – notwithstanding the requirement to ignore 'social and market trends'.

In the UK, the land ownership is highly concentrated. The Country Land & Business Association recently boasted its 50,000 members own and manage 60 per cent of the land in England and Wales (in the last year it appears to have taken this statistic off its website). Its membership is now given as 36,000, but the amount of land it controls may well remain the same, since the tendency has been for large farms to get even larger. While agricultural commodity prices were stagnating, profit margins became tighter and tighter, enabling the Government to argue that only farms with industrial economies of scale were efficient. Now with grain prices more than doubled and land prices nearly doubled, the surviving grain barons are enjoying a bonanza, while the countless small farms that have gone to the wall are reaping no benefits. Is this, one wonders, a 'market trend' that will be allowed to feature in the Foresight study?

In Scotland, the concentration of ownership is even higher, but the trend is in the other direction. The Land Reform (Scotland) Act 2003 has given communities first right of purchase when the feudal estates on which they are sited come on the market. Several of these buy-outs, such as on the Isle of Eigg, have become high profile not only for helping communities thrive again, but also for the sustainable innovations that flourish under community ownership.

The movement is spreading to England, with a growing number of schemes for local Community Land Trusts to take over and manage pockets of land that have evaded the grasp of speculative builders and industrial farmers. In the middle of this article I was called away to a meeting in West Coker, Somerset, where villagers are working up a bid for farmland owned by the County Council. The villagers want to establish a community farm

specialising in hemp and flax (the main product of the area until the end of the 19th century) together with local food production, affordable housing, renewable energy and other opportunities for the local economy. A senior district councillor was present to explain that, although he was sympathetic to their aims, the bulk of the Grade I agricultural land was destined to be sold off to developers for Yeovil's housing, in line with the Regional Spatial Strategy's call for 'harnessing the benefits of population growth', 'raising productivity' and 'overcoming barriers to economic growth'. Resistance, he counselled, was futile.

Will the Foresight team be analysing the effects of a Scottish-style return to community ownership as compared to selling off land to the highest bidder? As dispassionate scientists, they should – how land is managed is inextricably bound up with who owns it – but when land interests are involved it can be as hard for scientists to be dispassionate as it is for consumers to be green. In another notorious land use struggle in 2006 villagers at Wye in Kent exposed and fought off a conspiracy by Imperial College London and Ashford Borough Council to build more than 4,000 houses on land owned by Wye Agricultural College. Once the housing proposal had been abandoned, Imperial ignored a bid from locals for a community farm, preferring to lease the land to a farmer, Kevin Attwood, who also happened to be the brains behind another speculative venture to build more than 9,000 houses in the nearby Capstone Valley.

Imperial had taken over Wye College in 2,000 in what transpired to be a flagrant asset-stripping exercise, part of the countrywide project of selling off agricultural infrastructure. Courses were closed, lecturers fired and Wye College's renowned distance learning programme absorbed into Imperial's TH Huxley School of the Environment, Earth Sciences and Engineering. The Director of the TH Huxley School at the time, who publicly welcomed the takeover, was none other than the man who is now the Government's chief scientist and head of the Foresight study on land use, John Beddington.

This little incident may serve as a reminder to Mr Beddington and his colleagues that land use is inherently political, it reflects people's vested interests, and that if this side of the question is not addressed then the Foresight study will not tell us a great deal. E

**Simon Fairlie is editor of *The Land* magazine**

## CURRENTS

# Climate Camp is back

It provoked an absolute storm. CNN's ticker screamed that Britain was 'under siege' from environmental activists. Sky News dubbed it 'the world's most organised protest' and the *New Statesman* 'the most important protest of our time'. A band of pioneering environmental activists landed outside Heathrow airport last summer and injected energy and urgency into the climate change debate. The Climate Camp showed there are people sufficiently fed up with waiting for the Government to act that they are willing to put themselves where they can no longer be ignored – and they weren't.

BAA went to the High Court to stop the camp – they stopped me, unfortunately – and *The Evening Standard* ran a smear campaign. The attempted crackdown shows Climate Camp was the green movement at its most effective. If grassroots movements are the engines of social change, this is it: something special to counter the fear and sense of powerlessness that has gripped the debate on climate change.

The first Climate Camp was outside Britain's single biggest emitter, Drax coal plant, in 2006. Among its successes came the formation of Plane Stupid. The second, at Heathrow, emboldened and empowered the local resident's third runway campaign, whose profile has since rocketed. It also inspired a number of similar camps around the world. Next month, Climate Camp will be back – but will it be bigger?

> Perhaps you think our elected representatives will sort things out for us. Are you prepared to wait much longer?

From 3 to 11 August we'll be pitching tents near Kingsnorth in Kent, where plans are afoot for Britain's first new coal plant in three decades. The climate change imperative says we need a green army to derail E.ON's plans before they gather steam, yet Climate Camp has involved less than 2,000 people. I work for Greenpeace, an organisation with some 175,000 members in the UK. At least 174,000 of them didn't show up. As an *Ecologist* reader, by definition you're one of tens of thousands environmentally aware people who didn't either. In London, 70,000 people voted for the Green Party mayoral candidate and live within an hour of Heathrow, yet at least 69,000 of them didn't come. Why not?

With toilets, showers, wind-powered computers and a cinema, it's hardly trench warfare, and is timed to allow families to make it along in the summer. I've been trying to think why so few got involved. Perhaps you think our elected representatives will sort things out for us. Are you prepared to wait much longer? Maybe you think we're all scary, smelly eccentrics. This is a stereotype perpetuated by the media, which will ignore the group of normal-looking folk and slap a picture of the dreadlocked girl with fairy wings on the front page. Perhaps you're scared a wall of riot police will bash you and you'll end up in prison. Those yellow jackets are only there to intimidate you, so don't let them. Finally, maybe you just don't think direct action works – in which case you've perversely been proved wrong by a bunch of disgruntled hauliers who recently blocked roads and overturned government policy so they could pollute even more.

Britain supposedly has the most sophisticated debate on climate change in the developed world. Let's make Climate Camp 2008 show it. See www.climatecamp.org.uk for information. E

**Joss Garman is an environmental campaigner and journalist**

WATER METERS

# Watering down guidelines

Billing water customers individually is the only way to reward economy and discourage splashing out. **Alice Onwordi** reports on the leaky legislation behind water meters

With summer coming earlier and lasting longer each year, we can comfortably predict the annual summer headlines 'A Water Meter for Every Home' covering many a front page whenever no fresh photographs of Posh and Becks are to be had.

According to Ofwat, the water regulator, all newly built homes and individual apartments in newly built blocks should have their own water meters. That is what we've probably all read. The unspoken argument from Ofwat is that there is nothing like a nasty water bill to turn people's minds to water conservation.

Water bans on their own have not been effective. The great British public has found sneaky ways to break any water bans by sprinkling the lawn at night. Numerous hotlines to water companies to report the worst offending sprinklers have failed to stop water overuse during shortages, and despite water conservation announcements, many people like nothing more on a hot, sticky summer's day than a morning and evening bath with their favourite Bodyshop bathballs.

Others, much to their shame (or delight), discover their inner curtain-twitcher each summer when they tut-tut to their neighbours about the people opposite... who used the sprinkler again.

With England becoming the most densely populated country in Europe, many planning officials sense the carrot may have to give way to the stick. Hence the reports about guidelines from Ofwat to all the water companies.

In fact, the statement I received on this from Ofwat was... well, a bit watery. It said: 'Individual apartments in newly built blocks ideally should have their own water meter. *However* [my italics], the developer can agree with the water company to fit just one.'

What is mildly concerning is that building new apartments with individual water meters is 100 per cent feasible; if they are included in the plans and measurements for each apartment then installing them is a cinch. It is the older, Victorian homes, now converted into flats, where individual meters will be harder to install. The water companies have promised roll-out programmes to ensure most homes have water meters, but is hard to see if the will is there, given how accommodating they can be with developers.

In practice, the landlord in a property with a single meter for all the apartments can pay the water company directly for the tenants' water use. The landlord recoups this by dividing the cost equally between the tenants and charging them service charge. As such, those tenants who are profligate with their water use have no incentive to cut down.

There are incentives for the developer and the landlord to have a central water meter, one being that a single meter for the whole block is far cheaper to install. There is certainly less building work. Another is that in addition to charging for water use, landlords can charge an 'administration fee' to pay for the cost of dividing the water bill between tenants. This administrative fee is added to the weekly rent, presumably because the water company bills the developer each week for water use.

In my case, I was told to expect a weekly water charge of nearly £6. This charge, which included administration, would have brought my bill to around £300 a year – a whopping £120 annual increase on my water usage costs, compared to when I lived in an apartment with a meter.

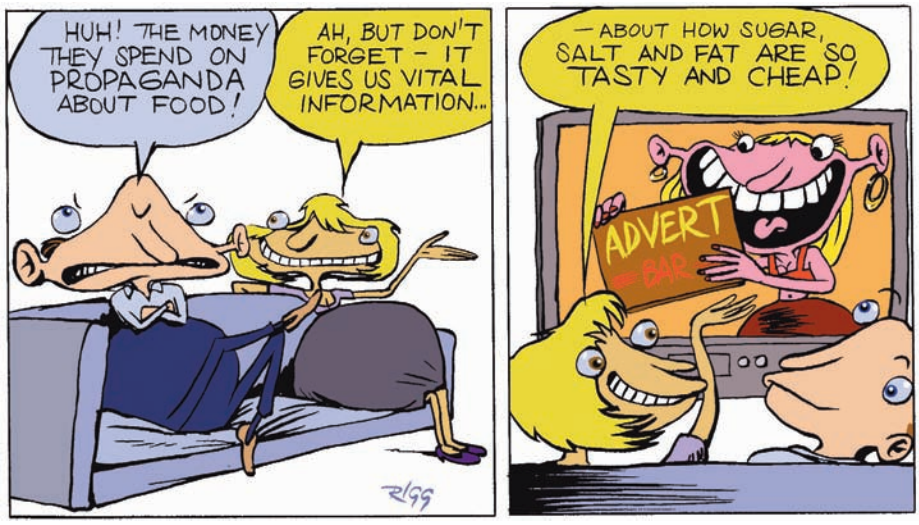
I discovered a new emotion called green rage. It comes over you when you know that despite your best efforts to collect rainwater to water the plants and putting nice little sacks into your lavatory water tank to cut down on water with each flush, your next door neighbour could be whooping it up and you could be subsidising them.

My lobbying for my own water meter was aided by Darren Johnson. I hoped he, as the chair of the London Assembly Environment Committee, could apply some green muscle. He emailed then-Mayor for London Ken Livingstone to ask whether he was using his planning powers to ensure developers installed water meters for each property in new apartment buildings.

Ken replied: 'All new properties are required

## GOOD BUY WORLD

PETER RIGG



to be fitted with a meter, as stipulated in my supplementary planning guidance. *However* [my italics again], I have been made aware that this may not always be the case and therefore I have asked the Water Resources Group to look at the issue of how we can ensure compliance.'

One might be tempted to think 'much good will that do', but we ecologists should never be cynical (well, not too often), and no doubt the Water Resources Group is powerful enough to force the developers and Thames Water to comply to the letter of the planning guidance of the, er, former Mayor of London.

Contacting the water board directly was also frustrating. It could not install water meters without the permission of the landlord. As tenants, we could not give permission for how we paid our water bill.

Several more letters to the landlord, including one from the local MP, finally ensured that we could be billed directly by the water board. As the developer would not install water meters, tenants would have to pay a flat water charge to the water company of around £250 a year. This bill was still less than we would have paid if we had been charged by the landlord. This 'nominal water rate' from the water board was based on the average water bill per household throughout the capital. Most of us are single, so we were paying more than we should. There was no longer the unfairness of subsidising your neighbour's water use. Instead, a single householder such as myself could be subsidising a family of five down the road.

After a final battle, the landlord gave us permission to ask the water board for individual water meters. We each contacted the water board and had to stay in while they came round to install them. The developers were under no compulsion to see they were installed before we moved in.

The song and dance we tenants went through makes me question the resolve to make householders cut down on water use. In my case and that of the other tenants, lobbying won the day over porous guidelines.

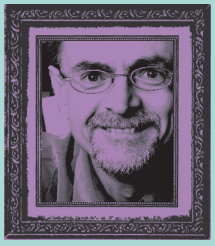
Without tougher measures, headlines such as 'A Water Meter for Every Home' seem no more than green gestures, but hope could be on its way. Thames Water recently made the headlines with its launch of a 10-year programme 'aiming to meter all *buildings* connected to the mains water supply by 2020'.

Apologies for creating another italic.

**Alice Onwordi is an environmental campaigner, writer and journalist**

## POST-CARBON LIVING

# Going to extremes



As the urgent necessity of our transition away from fossil fuels becomes plain, it's inevitable that some of us will take that necessity seriously enough to explore the edges of 'normal' behaviour. On the post-carbon frontier, the hardiest pioneers are those willing not only to apply ingenuity and make personal sacrifices, but also to look downright silly to the mainstream.

These trailblazers of sustainability tend to come in two shades: Techno-Green or Gandhi-Green. The former hue belongs to the individual who hopes to save the world with eco-gadgets; the latter to the saintly soul passionate about ceasing to do fuelish harm.

I met a brilliant Techno-Green engineer with every imaginable energy-saving, non-hydrocarbon-based home accoutrement: solar PV and hot-water panels, a ground-source heat pump, an electric car, solar cookers – plus power monitors everywhere feeding data into a laptop recording a second-by-second readout of energy expenditure.

Gandhi-Green is the tint of another pioneer who comes to mind – an earnest young woman who insists on walking everywhere (no motored rides, thanks! How and where was that bicycle made?), refuses to heat her cabin in the winter (easier here in California than in many places), eats mostly own-grown or foraged food, buys nothing new and eschews hot showers.

> As the era of cheap energy sputters, we'll be doing without lots of things. It will be essential to be frugal with good cheer

If there were a post-carbon contest, I'm not sure which of these extremists would win. Fortunately, there is no contest: we need both kinds – people willing to turn their lives into laboratories to test strategies that get us off fossil fuels fast.

The majority of people in our high-tech, commerce-driven society are likely to be more comfortable contemplating the Techno-Green solution. Going without anything is just not cool; indeed, it's exciting to think peak oil and climate change might offer excuses to buy new and better toys. Anyway, if technology helped get us into the mess we're in, surely it can help get us out.

The reality, as the era of cheap energy sputters, is that we'll all be doing without lots of things. It will be essential to know how to be frugal with intelligence and good cheer.

Most of us on the post-carbon path find ourselves hesitating between these extremes. We use computers and other tools made of depleting metals and minerals, powered by electrons from who knows where, hoping that by doing so we are moving in the right direction in other respects. We experiment with hydrocarbon asceticism, knowing that our very existence is still enabled by a complex society running on oil, coal and gas; a society vulnerable to convulsive failure, with endless casualties, unless we find ways to help it power down in a planned programme that will doubtless depend on the services of wind turbines, smart grids and other high-tech wonders.

We need both approaches, and we need people quirky enough and courageous enough to stake out territory on their fringes. Going to extremes may make one a curiosity, but in this instance it also makes one useful to our collective survival.

**Richard Heinberg is a Senior Fellow of the Post Carbon Institute, lectures widely on sane responses to fossil fuel depletion, and is the author of *The Party's Over* and *Peak Everything***

CARBON

# Emission impossible?

The Government has backtracked on radical plans for personal carbon trading schemes, reports **Jamie Andrews** – taking accountability for what we emit is the only way to go

Back in May 2006, when David Miliband was Environment Secretary, he outlined a new and exciting way to reduce carbon emissions: personal carbon trading. Two years later, the Department for the Environment, now led by Hilary Benn, recently came out to say that the policy won't be investigated beyond a 'pre-feasibility study'.

With set-up costs estimated at as much as £2 billion it's not hard to see why politicians are shying away from the idea, but what's been happening outside of the Government studies? And is Hilary Benn right to halt further investigation into the policy? The most robust vision of how a personal carbon trading system would work has been laid out by David Fleming in his work on Tradable Energy Quotas (TEQs), for more on which see http://teqs.net

Under the system, national emissions are split between industry and individuals: 60 per cent (industry emissions) would be covered by a high-level cap-and-trade scheme resembling a more stringent version of the current European Emissions Trading Scheme (ETS), with the remaining 40 per cent allocated to individuals who would trade among themselves. Those who want to continue driving their 4X4s and flying around the world would need to pay for their lifestyles by buying additional credits, while those with a low carbon footprint could cash in their carbon chips (in Miliband's words, the scheme 'has a simplicity and beauty that would reward carbon thrift').

Initially, the cap could be set close to existing emissions levels in order to give the economy time to adjust, but over time it would reduce in line with the principles of contraction and convergence (an international framework for emissions reduction that is gaining steady ground among influential policymakers). Crucially, under the scheme emissions permits would only need to be surrendered when purchasing fuel or home energy – gas and electricity – plus (in some versions of the scheme) flights. All other emissions would be covered by the industry trading scheme, with the knock-on effect of carbon-intensive goods (such as asparagus shipped from Indonesia in May) being more expensive to the consumer.

As well as addressing the possible costs of introducing the scheme, the study also looked at public acceptability. Although the notion of a personal carbon footprint is now relatively mainstream, there is quite a gap between understanding an annual footprint and coming to terms with managing the intricacies of a carbon budget. Torchbox, a web development company spurred into action by Miliband's original comments, felt it could play a part in helping bridge the gap between day-to-day understandings of energy and fuel use, and a robust policy proposal. It came up with The Carbon Account, an online carbon calculator that, instead of simply giving a snapshot annual footprint, allows users to keep coming back and entering car mileage, gas and electricity meter readings, and details of any flights.

> Those driving 4x4s and flying would need to pay for their lifestyles by buying additional credits, while those with a low carbon footprint could cash in their chips

The resulting site – www.thecarbonaccount.com – lets users see their monthly emissions plotted on a graph, clearly visualising the seasonal variations in domestic emissions and how taking a flight hugely impacts on your carbon footprint (one long-haul flight is roughly equivalent to driving a car 10,000 miles a year). To follow through the logic of personal carbon trading, a tool such as the Carbon Account could help communicate the notion of having a 'carbon balance'.

Just like a normal bank account, it would be possible to go into debit or credit depending on the current cap on carbon emissions. Among the 800 users currently registered with The Carbon Account, a handful are part of Carbon Rationing Action Groups (see www.carbonrationing.org.uk). Where the Government is deliberating, some people are getting on with it: these small but vociferous voluntary groups have sprung up around the country with the purpose of closely monitoring and reducing their carbon footprint. Some focus on sharing reduction tips, while others have gone as far as to set a target and start trading among themselves.

There are 28 such groups, including 12 start-ups that have not yet decided whether to trade. As the groups experiment with the use of online tools to monitor, reduce and ultimately to trade, some interesting ideas are emerging about how the internet could play a part in the ultimate design of a personal carbon trading scheme.

The Government's own carbon calculator – Act on $CO_2$ – has sitting behind it a calculations engine that is freely available to any group or organisation wishing to get straightforward access to standard carbon conversion factors. The so-called Avoidance of Mass Extinction Engine (AMEE) is being run by a private company on behalf of DEFRA, on the condition that the programming code is open source, meaning anyone can copy and contribute to it (see http://amee.cc). AMEE also has a wiki (think Wikipedia) to discuss all of the different conversion factors.

All arguments about emissions factors – government figures or otherwise – can now be aired publicly. Linking the AMEE database to a personal carbon trading system could yield interesting results in terms of transparency and collective ownership of the necessary infrastructure. Similar concepts

can then be applied to the trading itself.

While the Government's pre-feasibility study focused on the set-up costs involving conventional banking infrastructure, some other quite different alternatives are being proposed. Trading between individuals is now a very real possibility because of the internet, and it's interesting to note the emergence of sites such as www.zopa.com, which offers 'loans between people, not banks'. If the objective is to move towards a more localised and distributed society in terms of energy economics then the web could be crucial.

Logical arguments about cutting out heavy infrastructure become more tangible in this light. The internet has already revolutionised numerous sectors; maybe we now have a chance to do it for energy and the environment. In keeping with the spirit of online collaboration, combining ideas such as cooperatively owned windfarms (the newest one to crop up is at Westmill near Swindon) with personal carbon trading could bring a whole new sense of community empowerment. Instead of simply relying on the green-mindedness of people concerned about climate change, personal carbon trading could give real financial incentives to those people looking to promote renewable energy in their community.

Limited literature exists on how this would work in practice, but the Zero Carbon Britain report by the Centre for Alternative Technology includes personal carbon trading as a key part of its robust vision.

So what next for personal carbon trading? The Environmental Audit Committee – a body of MPs established by Labour in 1997 and currently headed up by Conservative Tim Yeo – reacted swiftly to DEFRA's pre-feasibility study, saying the Government should go ahead with plans to investigate further the policy despite the conclusions of the report's authors.

Hilary Benn has stuck by his department, pointing to a number of non-governmental studies looking into the policy (the Institute for Public Policy Research and the Royal Society for the Encouragement of Arts, Manufactures and Commerce both have projects underway). It's clear that committing to something so radical would not be an easy choice for any politician. However, with soaring oil prices, and decades of economic growth finally coming to an end, it's looking increasingly unlikely that things will be easy for anyone. E

**Jamie Andrews is project coordinator for The Carbon Account**

## TECH RECKONING

# Flask-grown flesh

If radical vegan Ingrid Newkirk has her way, the nouvelle cuisine on vegetarian menus in five years time may be a big juicy steak. Newkirk, founder and president of People for the Ethical Treatment of Animals (PETA), has offered a $1 million prize to whoever can scale-up stem cell techniques that grow edible animal tissue – so called lab-grown meat – for a mass market.

This artificial meat, cultured from muscle cells and already been grown on a small scale, could spare millions of animals, PETA argues. It hopes for cruelty-free test-tube turkey meat in time for Christmas 2012. Industrial advocates, such as the New Harvest Foundation, point to the environmental benefits. They claim the technology might help offset the 18 per cent of current greenhouse gas emissions attributable to animal production. Taking land out of livestock grazing and diverting protein away from animals could also help rebalance the food system.

All of which are good arguments against meat-eating, but not necessarily for the proposed switch to flesh in a flask. Meat-eaters and vegetarians I floated the idea past seemed equally horrified by the idea – more so than eating dead animals. PETA's prizewinner may need to spend further millions of PR dollars convincing the public. *The New York Times* reports 'near civil war' within PETA, with members leaving in protest. Opponents point out that meat's known health problems are not addressed; others worry new safety risks might appear, especially if tissue engineers turn to genetic engineering to improve their cultured flesh.

> Culturing exotic meats opens new niche markets – anyone for lion? A panda burger? What about ethical human cannibalism?

Organic production will likely exclude lab-grown meat in principle, while kosher and halal will have a hell of a fight. Nor is it a shoo-in that lab-grown meat will replace the animal meat market. Culturing exotic meats opens new niche markets – anyone for lion? A panda burger? What about ethical human cannibalism?

Most intriguing about the PETA prize is the switch in strategy it represents for civil society activism. Newkirk and her colleagues appear to be giving up on the battle to protect animals through social legislation and putting their faith (and money) into a technological silver bullet, a lab-cultured quick fix. It's a familiar story: climate change campaigners, depressed by the battle to change carbon-hungry lifestyles, embrace nuclear power. Global health advocates push for pharmaceutical 'solutions' rather than against inequality and poverty. The argument that social change is too hard leads single-issue fanatics to depend on technological and market fixes for the heavy lifting.

Of course social change is hard and sometimes dispiriting, but its also extremely important. Abdicating to the efficiency of the market means abandoning important nuances. Social justice and notions of equity tend to be ignored by markets that often hand technological control to the already powerful. If test-tube meat hits the big time, we will likely know by its appearance in a Big Mac or when agribusiness buys out the patent-holder. Farmers will not benefit at all. Lab-grown meat may taste cruelty-free to PETA, but it smells like the same old rotten industrial food system to me. E

**Jim Thomas is a research programme manager and writer with ETC group (www.etcgroup.org)**


## BEHIND THE LABEL:

# Head & Shoulders Classic Clean

It's time to come clean, says **Pat Thomas** – anti-dandruff shampoos are nothing but advertising puff and chemicals

Take a look at the multitude of celebrity advertisements and outrageous claims for shampoos on TV and in magazines and it is easy to lose sight of the simple truth: the main function of a shampoo is to clean the hair.

Its function is so simple – so boring even – that manufacturers have to work doubly hard to make it sound more complicated and exciting than it actually is. Thus, if the ads are to be believed, using a particular brand brings with it the promise of harmony, lust for life, nourishment and adoration by members of the opposite sex. Some shampoos are apparently so remarkable that they not only clean your hair, but also give you an orgasm.

Underneath all the puffery, however, a shampoo is just a bottle of highly coloured, highly perfumed detergent, and – in spite of 'scientific' claims for specific ingredients such as pro-vitamins – the difference between an own-brand bargain bottle and a designer shampoo is usually only the price.

Because around 90 per cent of us already buy shampoos regularly, the shampoo market is not exactly a growth market. What more can the manufacturers sell us, after all? How many bottles of shampoo does a person need all at once? Nevertheless manufacturers continue to jostle for market share and work extra hard to catch the consumer's attention by segmenting the market – that is, creating smaller and smaller niches to be filled up with specialist shampoos. As a result, in a bid to persuade consumers to keep more than one bottle of shampoo on hand, 'problem-solving' shampoos have become a popular addition to basic ranges.

This process of segmentation has now reached such heights that consumers can walk into a supermarket and buy a haircare range that is (apparently) appropriate to the type, colour and even age of their hair.

The UK shampoo market is worth around £316 million a year. Head and Shoulders, made by Procter & Gamble (P&G), is the number-one-selling shampoo. In a bid to keep it in the top spot, P&G recently relaunched Head & Shoulders shampoo with modern new packaging and a campaign to emphasise the

## Ingredients

Aqua, Sodium laureth sulfate, Sodium lauryl sulfate, Cocamide MEA, Zinc carbonate, Glycol distearate, Sodium chloride, Zinc pyrithione, Dimethicone, Cetyl alcohol, Guar hydroxypropyltrimonium chloride, Parfum, Sodium xylenesulfonate, Magnesium sulfate, Sodium benzoate, Ammonium laureth sulfate, Butylphenyl Mothoxypropional, Linalool, Sodium diethylenetriamine pentamethyl phosphonate, Magnesium carbonate hydroxide, Hexyl cinnamal, Benzyl alcohol, Eitdronic acid, Hydroxyisohexyl 3-cyclohexene carboxaldehyde, Limonene, Citronellol, Paraffinum liquidum, Sodium polynaphthalenesulfonate, Methylchloroisothiazolinone, DMDM hydantoin, Disodium EDTA, Tetrasodium EDTA, Methylisothiazolinone, CI 42090, CI 60730

## Alternative treatments

Because dandruff is caused by a fungus it is probably most effectively tackled from the inside out. Effective dietary measures include cutting out sugar and yeasty foods, supplementing with B-complex and probiotics (acidophilous and bifidobacterium), and drinking plenty of water each day. Essential oils of tea tree, rosemary and thyme can also be applied topically (mixed with cider vinegar) at bedtime.

While it is almost impossible to make an 'all-natural' shampoo, consider these less unnatural alternatives for dandruff control:

- Conditioning Dandruff Shampoo **www.theorganicpharmacy.com**
- Weleda Rosemary Shampoo **www.weleda.co.uk**
- Florame Purifying Anti-Dandruff Shampoo **www.florame.co.uk**
- Thursday Plantation Tea Tree Anti-Dandruff Shampoo **www.auravita.com**
- Nature's Response Organic Anti-Dandruff Shampoo **www.healthstore.uk.com**
- Hope's Relief Herbal Shampoo **www.healthfoodonline.co.uk**

product's cosmetic value as well as its anti-dandruff properties.

In fact, shampoos belonging to the P&G stable occupy the top three spots, with Pantene and Herbal Essences being the second and third most popular shampoos in the UK respectively. Together, these three account for approximately 30 per cent of the UK shampoo market place.

Dandruff shampoos are made with detergents to which anti-flaking agents, such as coal tar, zinc pyrithizone, salicylic acid and selenium sulphide, are added. While they can relieve itching and decrease flaking, none can control dandruff completely.

Sulphur and salicylic acid work by breaking flakes into smaller, less noticeable pieces. It is thought that coal tar, selenium sulphide and zinc pyrithizone can slow the production of flakes; beyond this, little is known about exactly how anti-dandruff shampoos work.

Of all the anti-flaking agents, zinc pyrithizone, contained in Head & Shoulders, and coal tar are considered to be the most effective in controlling dandruff.

All anti-flaking agents have some side effects. They can be irritating both to skin and eyes. Salicylic acid, in particular – an ingredient of aspirin – can be severely irritating, and is a poison if swallowed. Coal tar is a known carcinogen and can also be an irritant when inhaled or when it comes into contact with skin.

## 'Most anti-dandruff shampoos amount to a kind of chemical warfare on your scalp'

Most anti-dandruff shampoos amount to a kind of chemical warfare on your scalp, when a more natural approach might do just as well. Dandruff appears to be related to the fungus *Pityrosporum ovale*. Tea tree oil has antifungal properties with activity against *P. ovale* and may be useful in the treatment of dandruff. Studies have shown that a shampoo containing at least five per cent tea tree oil can be an effective way to tackle flakes. Effective as they may be, most of the shampoos that you can find online and in your health store don't come with the big advertising budget of a multinational behind them, so most of us never hear of them and never think to try a simpler alternative. E

**Sodium laureth sulphate (SLES)**
**Purpose:** Detergent
**Adverse effects:** Skin dryness, eye irritation, penetration enhancer. Laureth compounds can be contaminated with 1,4-dioxane, a carcinogen linked to breast cancer.

**Sodium lauryl sulphate (SLS)**
**Purpose:** Detergent and foaming agent
**Adverse effects:** SLS is a harsh cleanser often used as an engine de-greaser. It's added to toothpaste to make it foam, but is not necessary to clean your teeth. Irritating to the mucous membranes in the mouth, can cause mouth ulcers, canker sores and contact eczema.

**Cocamide MEA**
**Purpose:** Detergent
**Adverse effects:** Skin, eye and lung irritation, contact allergies. Animal studies show damage to immune system and organs. Can react with formaldehyde-releasing ingredients to form carcinogenic nitrosamines (see Sodium polynaphthalenesulfonate).

**Zinc pyrithione**
**Purpose:** Anti-dandruff
**Adverse effects:** Skin irritant. Animal studies show damage to immune system and organs. Persistent and bioaccumulative in the environment.

**Dimethicone**
**Purpose:** Conditioner, film-former
**Adverse effects:** Skin irritant. Film-formers coat the hair to make it feel smooth, but confer no real moisturising properties.

**Hydroxyisohexyl 3-cyclohexene carboxaldehyde**
**Purpose:** Fragrance
**Adverse effects:** Also known as Lyral – can cause contact allergic reaction, especially in eczema sufferers.

**Parfum**
**Purpose:** Fragrance compound
**Adverse effects:** Central nervous system disruption (e.g. headache, mood swings, depression, forgetfulness); allergen; triggers asthmatic reactions; skin irritation. Some perfume ingredients, such as artificial musks and phthalates, are hormone-disrupting.

**Sodium diethylenetriamine pentamethyl phosphonate**
**Purpose:** Sequestrant
**Adverse effects:** Prevents metals in the mix having an adverse effect on product performance, appearance or stability by reacting with them. A common ingredient in liquid laundry detergents, where it acts to prevent/disperse soap scum. Effects in humans have not been studied.

**Linalool, Hexyl cinnamal, Benzyl alcohol, Limonene, Citronellol**
**Purpose:** Synthetic fragrances
**Adverse effects:** Must be listed on the label because they are severe allergens. Can also cause central nervous system disruption (thus their use in certain pesticides) and skin, eye and respiratory tract irritation. Can trigger asthma attacks.

**Paraffinum liquidum**
**Purpose:** Lubricant, emollient
**Adverse effects:** Aka mineral oil, this cheap ingredient produces a temporary moisturising effect. Penetration enhancer, can cause skin (scalp) dryness. Can be contaminated with polycyclic aromatic hydrocarbons (PAHs). Some PAHs are potential human carcinogens linked with an increased risk of breast cancer.

**Sodium polynaphthalenesulfonate**
**Purpose:** Emulsion stabiliser, surfactant
**Adverse effects:** Irritating to mucous membranes, can release low levels of formaldehyde, which react with DEA and DEA-containing ingredients (see Cocamide MEA) to form carcinogenic nitrosamines.

**Methylchloroisothiazolinone, methylisothiazolinone**
**Purpose:** Preservatives, together known as Kathon CG
**Adverse effects:** Strong allergens, they bind quickly to the skin, remaining there long after use. Nerve damage; potential mutagen; a suspected carcinogen due to its corrosive action on the skin.

**Disodium EDTA, Tetrasodium EDTA**
**Purpose:** Preservatives
**Adverse effects:** Skin and eye irritation, contact dermatitis; penetration enhancer. Environmentally persistent, binding with heavy metals in lakes and streams, aiding their re-entry into the food chain.

**Pictured**: They're watching you – police at last year's Climate Camp
**Opposite**: Plane Stupid protesters on top of the Houses of Parliament

ECOLOGIST FILM UNIT

# The real saboteurs

Government and big business are countering resurgent eco activism with spies, strong-arm tactics and news manipulation. Who are they calling terrorists? asks **Andrew Wasley**

The building, in a ubiquitous leafy street in south-west London, is unremarkable, but this Fulham house is at the centre of a controversial plot that reads like something out of an Ian Fleming spy novel.

It is the home of Toby Kendall, an employee of the 'special risk management' and security consultancy C2i International, who went undercover to spy on members of Plane Stupid, a group tackling the aviation industry head on.

Operating under the pseudonym Ken Tobias, Kendall, 24, spent a year covertly gathering information on Plane Stupid, attending meetings and participating in protests. Kendall's infiltration was exposed when Plane Stupid fed the Oxford-educated 'activist' false information that found its way back to the aviation industry and journalists.

He wasn't in when the *Ecologist* visited – sources say he is currently in China, though still on the payroll of C2i International – but the affair is the latest in a series of attempts to thwart the UK's fast-growing climate campaign movement.

Plane Stupid and other climate campaigners have increasingly found themselves on the receiving end of a disturbing pattern of legal threats, injunctions, dawn raids, arrests, solitary confinement, espionage and sensationalist press smears.

Although radical environmentalists have long been targeted – as the battle lines between big business, the Government and climate activists are drawn ahead of August's 'Climate Camp' at Kingsnorth power station, in Kent – campaigners are warning that the situation looks set to heat up for an unprecedented showdown.

Plane Stupid is at the forefront of this looming confrontation. Set up in 2005 by a young group of activists wanting to disrupt an aviation conference in a London hotel, the campaign has helped put climate change – and those responsible for it – both on the political map and the front pages.

Building on the principles of non-hierarchical organisation and direct action advocated by anti-roads groups such as Earth First! and Reclaim The Streets a decade ago, Plane Stupid offers an umbrella for as many as 200 climate activists operating across the UK.

The group has occupied airport runways, closed down aviation meetings, blockaded travel agents, disrupted parliamentary business and demonstrated on the roofs of the Westminster and the Scottish Parliament. Such actions, combined with a rare accountability and a highly media-savvy approach, has led to the group being dubbed the 'new pin-ups of the environment movement' and won them support from a variety of quarters.

## A direct-action collective

'We realised across the country, outside every airport where there are expansion plans – which is almost every airport in Britain – there are well-established residents campaigns concerned about noise, about air pollution and, in the case of Heathrow, about house demolitions and ancient woodlands [being destroyed],' says Joss Garman, a Plane Stupid founder and *Ecologist* columnist.

'We wanted to bring these [groups], which were using conventional campaigning methods, together with the environmental movement, and with direct action in particular, as had been done with the anti-roads movement.'

Photography: AMY SCAIFE

One major difference between the anti-roads movement of the 1990s and the contemporary climate campaign is the reaction of more mainstream NGOs.

When the bulldozers rolled in to the Twyford Down motorway extension near Winchester in 2003 and were physically blocked by Earth First!, many in traditional environmental circles were critical, worried about the bad press the 'dreadlocked anarchists' would bring to their cause. Such fears were exacerbated when clashes between the protesters and hired security turned ugly, and were fuelled further by tabloid scaremongering over 'militant activists'. Fast-forward to the present, however, and most of the larger environmental NGOs are happy to support Plane Stupid and other similar groups.

'This new breed of activism [on climate issues] has actually given a much-needed wake-up call to the movement as a whole,' one seasoned campaigner said. 'It has reawoken interest in, and support for, more radical action.'

Although having the highest profile, Plane Stupid represents only part of the new climate campaign movement.

Rising Tide, the global network of direct action groups focused on climate-related issues, caught the imagination of many when it began proactively targeting the companies blamed for the looming climate catastrophe.

In 2007, the group famously invaded the Natural History Museum in London and threw oil across wildlife photographs to protest at oil giant Shell's sponsorship of the annual exhibition. Shell has said it will no longer be sponsoring the event.

'One of the things about Rising Tide is that every day is a day for direct action,' commented one Rising Tide activist, Iggy. 'If you look around you'll find something that is wrong. An example would be Newcastle, in Australia, one of the world's largest coal ports. Rising Tide shut that down with boats. More locally, if you throw a stone you'll hit a headquarters of a business that is investing in a [oil] pipe running through somewhere.'

The group admits it is at the radical end of the current surge in climate campaigning – some members believe the only way to tackle climate change is to confront capitalism head-on – but Rising Tide draws its 'membership' from a remarkably diverse range of people.

Indeed, when the *Ecologist* was invited to meet with a number of climate activists planning forthcoming actions it was told in advance 'you'll be surprised at some of the people involved: nurses, IT workers, a chef...'

Such is the perceived threat posed by the growing wave of climate activism that those whose business interests are under fire – and the authorities – have begun to strike back.

Although it has yet to be established who hired C2i International to infiltrate Plane Stupid – initially BAA, owners of Heathrow, denied any involvement, before backtracking to admit it had been 'approached' by the security firm – the affair is illustrative of the lengths aviation and energy corporations are prepared to go to thwart activists.

## The powers that be overreacting

Plane Stupid members first found themselves – collectively – on the receiving end of the long arm of the law when in 2006 they occupied the runway of Nottingham's East Midlands airport in an action drawing attention to the environmental carnage caused by flying.

Having delayed hundreds of passengers, they were arrested and later charged with aggravated trespass and causing a public nuisance. Several of the activists – including Rose and Ellen Rickford, then aged just 21 and 18 respectively – later claimed they were held in solitary confinement for more than 24 hours, that their houses were raided and computers, phones, diaries and address books confiscated.

Malcolm Carroll, a Baptist minister and Greenpeace campaigner, who was also arrested after the Nottingham action, says he was shocked that the police classified the protest as a major terrorist incident, bringing in armed police, helicopters and hostage negotiators.

"[The] police raided [me] twice, came back twice. My son thinks at one occasion they had a firearm. As a parent, now that really troubles me. It probably upsets me more than anything,' says Caroll. 'But they took this stuff: my computer, phone, his computer, his mobile phone, for goodness' sake. They took my records, my files... well, they didn't take the files, they took my entire filing cabinet – a big four-drawer filing cabinet of personal stuff and family memories and that sort of business.'

Controversial police action followed at last year's Climate Camp at Heathrow airport, where officers invoked anti-terror legislation to police the event. The powers enabled them to stop and search whomever they wished, hold people for up to a month without charge and raid activists' houses.

One activist, student Christina Fraser, was stopped while riding a bicycle near the airport, held for 30 hours under suspicion of terrorism and then charged with conspiring to cause a public nuisance.

BAA had earlier sought an unprecedented injunction against organisers of the Climate Camp, claiming the planned protests would expose the airport to the risk of terrorism, and citing the Protection from Harassment Act.

Although the injunction named only four people in particular, by including five protest groups it threatened to affect more than five million individuals and was described by the defence as 'the most extraordinarily wide-ranging injunctive relief that has ever been sought from the courts of this land'.

'This new breed of climate activism has reawoken interest in, and support for, more radical action'


In Oxfordshire, opponents of RWE nPower's moves to drain Radley Lakes in order to turn them into an industrial dump found themselves subjected to a similarly draconian injunction, preventing them from coming to, remaining on, trespassing or holding demonstrations on the company's land.

Those that did attempt to approach would have been faced by security guards wearing masks or balaclavas and filming and photographing protesters. Adrian Arbib, a news photographer, was also later served with a high court injunction by two solicitors and four 'black-clad' security guards working for nPower, apparently in an attempt to prevent

Photography: COURTESY OF PLANE STUPID

him documenting the company's activities.

More recently, after a biofuels demonstration in Edinburgh, activists claimed they were subjected to a 'massive police overreaction' and deprived of food, water and medical attention while being held in cells after being arrested. Some of the activists say they've since been woken in dawn raids by the police, and asked to become paid informers.

Rising Tide says it too has encountered problems, that the amount of police surveillance activists now encounter is dramatically increasing and that individuals are being targeted.

Although disturbing, veteran campaigners say the experiences of the climate campaign movement are not entirely unique, and that protest movements of past years also encountered similar levels of surveillance, infiltration and harassment.

Paul O'Connor, from radical news agency Undercurrents, which has reported on the UK's protest movement since 1994, told the *Ecologist*: 'Over the years we've noticed that time and again the harassment starts before a protest, where they have undercover policemen, secret [detective] agencies infiltrating protest groups to try to find out who these people are and what they are planning next.'

**Left**: In 2007, Rising Tide activists splashed oil across a display of wildlife photographs at the Natural History Museum to protest against Shell's sponsorship of the exhibition

According to Undercurrents, the Toby Kendall affair comes on the back of a string of similar infiltration attempts.

## The spying game

In the 1990s, it emerged that campaigners battling McDonald's were constantly spied upon by undercover agents working for the corporation. Protesters targeting the Newbury bypass were infiltrated, too – by detective agencies passing on information to Group 4, the outfit hired by the Government to protect its road-building programme.

More recently, the Campaign Against the Arms Trade was targeted by spies working on behalf of BAE Systems, and anti-Iraq War protesters claim they have been subjected to similar attempts. Previously, Reclaim The Streets – the anti-car-culture party collective – and hunt saboteur groups have alleged they have been targeted by detective agencies and undercover police.

Video-journalists seeking to cover events from the point of view of activist groups have also found themselves in the firing line. They claim there has been a documented pattern of police – and others – attempting to 'manage' the news in relation to protest issues.

'Over the years, reporting on all these different type of protests, nearly all the people working for [Undercurrents] have been arrested at some stage,' says Paul O'Connor.

'We have probably had about 15 cases now, and what's interesting is that none of our journalists has been charged; it's a constant thing that we are arrested, seized and held in police custody until after the deadline for the news have passed. The only thing we can say is that's news management.'

> 'There has been a pattern of police attempting to "manage" the news in relation to protest issues'

Such was Undercurrents' concern about police attempts to thwart their reporting of protests that it produced a groundbreaking documentary – *Breaking News* – dedicated to exposing the problem.

The film revealed some of the first hard evidence of police attempts to manage the news, including an incident where officers erased the contents of a tape containing film of a protest – but mistakenly recorded themselves doing so.

Some of the mainstream press have likewise been accused of presenting a sensationalist picture of climate campaigners.

London's *Evening Standard* was recently rebuked by the Press Complaints Commission (PCC) after the newspaper was found to have run a highly inflammatory and inaccurate article alleging that during last summer's Climate Camp, campaigners planned to bring Heathrow to a standstill – using hoax bombs and assaults on the airport's perimeter fence. The case was one of the first to be brought by activists themselves and marks an important milestone, say campaigners, in standing up against the frequent attempts at smearing protest groups.

Campaigners say other news outfits have been equally guilty of creating scaremongering headlines; several further PCC adjudications relating to climate protest stories are in the pipeline, involving, among others, *The Sun*, the *Telegraph* and *The Mail*.

Organisers of this year's Climate Camp at Kingsnorth say they are optimistic that the PCC's ruling will discourage similar smear attempts around the protests next month, but are prepared to take a robust stance against those that try.

'I'd be surprised if we don't see one or two of the newspapers trying to stitch up [the Climate Camp] to suit their own agendas,' one camp organiser says, 'but we are looking at ways to minimise the opportunities [they get] to do hatchet jobs.'

Campaigners say they will be keeping an eye on the 'spinning' activities of E.ON, however, the company behind the planned development of Kingsnorth power station, as they prepare to defend their position in the face of the coming protests.

Last year BAA was accused of negative 'spinning' designed to influence the media and public against the objectives of climate campaigners. It emerged earlier this year that E.ON had secured the services of Edelman, the world's largest independent public relations company, to manage its public affairs over the issue. Edelman represents, among others, Mars, Pfizer, Microsoft and Shell.

In the US, Edelman has been accused of faking blogs to promote the ethical integrity of WalMart, a client. Here, campaigners uncovered what they describe as unusually close links between Edelman and the Government.

Earlier this year it emerged the Department for Business, Enterprise and Regulatory Reform (BERR), the body responsible for decisions on the future of coal power, had appointed a new head of communications, Neil Spring – until recently chief lobbyist at Edelman.

Also until recently, one of Edelman's directors was identified as Heather Rogers, wife of John Hutton MP, the head of BERR. Although there is no suggestion of illegality or wrongdoing, the cabinet minister has previously faced calls for an inquiry over his wife's business interests as a lobbyist.

Although Edelman's involvement over Kingsnorth has yet to correspond with any upsurge of anti-Climate Camp headlines, activists say the company's appointment corresponds with a number of announcements that conveniently suit E.ON.

'Suddenly, bizarrely, we have [E.ON] asking the Government to delay the final decision over Kingsnorth until after the summer's actions, when [attention] will be on the issues,' one Climate Camp insider said. 'And the trial for [Greenpeace] activists charged after their occupation of the power station is, without explanation, delayed until after the camp.'

Locally, too, campaigners are critical of the 'hyping-up' of the forthcoming camp; police and local councillors have set up special hotlines for concerned residents to call if worried, and are encouraging local people to report 'suspicious behaviour' they think may be connected to the camp.

At two public meetings organised by the authorities to 'reassure' local people, opposition to the protests, according to some reports, has been overwhelming. When the *Ecologist* visited the region, however, most people appeared unaware of the protest, of E.ON's plans for Kingsnorth or what it means for the local region and climate change as a whole.

Although some reports have played down the scale of the forthcoming action, organisers say they are confident of a large turnout, such is the growing support for campaigns highlighting climate issues. They also say that the number of people prepared to participate in direct action is growing.

'The stakes are higher now than ever before and people are prepared to take a stand and to do something,' says one London-based climate activist, who wished to remain anonymous.

'In the past, with other [issues] people may have been wary about breaking the law or becoming involved in militant action, but with climate they've realised they have little choice.' E

**Andrew Wasley is a journalist and producer at investigative agency Ecostorm (www.eco-storm.com)**

### Now watch the film...

As the battle between climate campaigners, energy corporations and the Government heats up this summer, in a special film investigation to accompany this report the *Ecologist Film Unit* examines the truth behind the spin and the sensationalist headlines, and asks: who are the real eco-terrorists? To watch the film, see **www.theecologist.org/ETV**

# An intentional community

The true meaning of community is alive and well and living on a small island off the east coast of Scotland. Having won the right to govern themselves, the people of Eigg are setting an example to the world. Story and pictures by **Peter Marshall**

**Main picture**: Eigg's beauty is unquestioned, but there is far more to the island than scenic views
**Below**: Dean Wiggin and skipper Angus working on the Eigg Creel boat

***'Recalcitrant tenants, squatters, junkies, weirdos, hippies, New Age travellers and reds...'***

This was the description applied to residents of the Isle of Eigg by the island's owner, Keith Schellenberg, in 1995. It came shortly after he had issued eviction notices to many of the islanders, including John Chester, the Scottish Wildlife Trust warden who had lived on Eigg since 1986. The islanders' sin in the eyes of Schellenberg, other Scottish landowners and their powerful friends, was to attempt to buy the island they lived on. The islanders had publicly challenged Schellenberg's views in an open letter published in the West Highland Free Press:

'We who have been born and brought up on the isle of Eigg would like to refute utterly the ludicrous allegations about the community here, made by Keith Schellenberg. The island has a small but united population of local families and incomers who are between them struggling to develop a community with a long-term future against the apparent wishes of an owner who seems to want us to live in primitive conditions to satisfy his nostalgia for the 1920s.'

For 250 years the Isle of Eigg, a few miles off the north-west coast of Scotland, had been in private ownership. For 250 years it had also been in decline. By the time of Schellenberg's reign as laird on the island, a once-thriving community supporting as many as 400 people had dwindled to less than 60. Houses were in a poor state of repair, fields were no longer maintained and the islanders struggled to survive. Many were forced to rely on state benefits, as the laird had dismissed them. Incomers attracted to the island by Schellenberg with offers of work and housing had found themselves with neither and were living in caravans. The island was being turned into a rich man's plaything, and those who lived there were treated as objects of derision by its owner.

This came to an end on 12 June 1997, following a long and bitter campaign, when the islanders bought back what should always have been theirs. Since then the Isle of Eigg has been owned and managed by the Isle of Eigg Trust, a company made up of residents, the Scottish Wildlife Trust and the Highland Council. The past 11 years have seen major changes take place on the island, many as a direct result of the change in ownership.

## No man is an island

Dean Wiggin is an example of an incomer who arrived on the island after the buyout. Dean was a lorry driver from Walsall in the West Midlands. As a climber and keen sea kayaker, he spent every moment of free time he had in the Scottish Highlands. While camping in Arisaig on the mainland one evening he spotted an advert in a local paper.

'"Eigg Feis and Ceilidh" caught my eye,' Dean says. 'Just what I need, I thought. Music, dancing and drinking.'

As he packed up to go a local woman told him, 'Dean, if you go to Eigg you'll nae come back.' She was right: Dean has been living and working on Eigg for more than five years now.

Like everyone on Eigg, Dean has lots of different jobs. Since coming to the island he has worked on the fishing boat, helped with fencing, cleaning toilets and building work. This winter he joined the island's forestry team, a group led by resident tree surgeon Alastair Kirk. Dean takes me to the sitka spruce woods, planted by previous landowners as tax breaks, to show me what was going on.

'Rubbish trees,' he says. 'Useless and harmful to the land they are planted on. We are cutting them back section by section to provide breeding ground for many birds, especially the hen harrier.'

This work is planned and supervised by John Chester – or 'Birdy' as he is universally known – the wildlife warden once threatened with eviction. Dean tells me Birdy knows every bush on the island, and every bird in each of those bushes. 'Birdy knows Eigg like nobody else,' he says. 'When Birdy says cut this bit of forest and

hen harriers will nest, you know it will work.'

Dean also takes me to see the latest and possibly one of the greatest achievements of the Eigg Trust: an entirely renewable energy generation system. Until this year, electricity on the island was generated for the most part by diesel generators; a few wind power generators had been built by those that could afford them and a small hydro scheme powered the island's tea room, shop and office. The one thing that united all the islanders was the need for a power grid for all, and they wanted it to be a reliable and clean source of energy.

The scheme that came online on 1 February 2008 combines wind turbines, a hydro generator and a series of solar panels. It is controlled by Eigg Electric Ltd, a subsidiary company of the Trust. All the homes on the island are now connected to a mains supply, which has limiters built into the system to prevent overuse of energy – even with a mains supply that is carbon neutral the islanders do not want to become as energy dependent as those on the mainland. The new energy scheme will not only make life a little easier for islanders, but also allow many of their business ideas to come to fruition.


## 'A strangely addictive quality'

Berni McCoy is another incomer; she is keen to take advantage of the island's new potential. Originally from Nottingham, Berni first came to the island to work as a volunteer with the Scottish Wildlife Trust.

'When I used to come up to Eigg to volunteer I always swore I could never live here, much as I loved it,' she recalls. 'Eigg has a strangely addictive quality to it, however, and I've always felt at home here. People talk a lot about "lack of opportunity" in places like this, but actually I think there are loads of opportunities. True enough there are certain things it's just impossible to do or achieve from here, but if you do want to do something – as long as it is practically possible – you can make it happen, and you don't necessarily need to have loads of cash either.'

Berni is a regular worker in the island's shop; she is an elected director of the Trust and is studying for a diploma in herbal medicine. She helped set up a credit union on the island and has built a wonderful vegetable and herb garden. She showed me how she follows traditional practice in using seaweed as a mulch and fertiliser, producing most of her own vegetables.

'Eigg attracts those who often revel in their own individuality and are naturally suspicious of anything that undermines this'

These days 'community' has become a political buzzword. Communities defined by ideas such as race, sexual orientation, nationality, religion or shared interests (I was recently introduced to an individual as a 'leading member of the local bird watching community') can make it easier for political leaders to treat people on a collective basis rather than as individuals.

A place such as Eigg attracts those who often revel in their own individuality and are naturally suspicious – given the history of outsiders imposing their social structures on the people of the Highlands – of anything that undermines this. On the basis of a shared geography, however, the people of Eigg, incomers as well as those born and bred here, have built a community that is focused not only on the needs of the people themselves, but also on the reality of geography they share.

The land makes the people and the people make the land. Two hundred and fifty years after a land ownership system that was entirely unsuited to the people, economy and environment of the Highlands was imposed upon them, a group of 'recalcitrant tenants, squatters, junkies, weirdos, hippies, New Age travellers and reds' have done more in 11 years to benefit the Isle of Eigg than all its previous owners.

**Peter Marshall is a photojournalist based in Birmingham. His book *Incomers – An Island Life* is available from www.blurb.com**

**Main picture**: These turbines produce most of the power for the island's electricity scheme
**Opposite**: Dean working as part of Eigg's forestry team

**Below**: Wildlife abounds – and romance blossoms – on this remote Scottish island

# CAN FLYING

# EVER BE GREEN?

Soaring fuel prices and stratospheric carbon emissions bode ill for the aviation industry. Is flying beyond redemption? **Mark Anslow** tries some blue-sky thinking

The soaring cost of crude oil works in mysterious ways: hard-up hauliers park their rigs along London's A40, fishermen camp outside Defra with placards and motorcyclists ride noisy go-slows on the M62.

Airlines, however, are much less demonstrative. They simply go bust.

In the last days of May, the world opened its financial pages to discover that Silverjet, the loss-making business airline with an ambition to be 'carbon neutral', had gone into administration. Squarely blaming the rising cost of aviation fuel, the company's directors cleared their desks in the same manner as their counterparts at the airlines Oasis, Eos and Maxjet, all victims of the price of oil.

The episode paints one thing in extraordinary clarity – the vast amount of fuel used by the aviation industry. What this means is that airlines are at the top of two concern lists: climate change, for providing the biggest easily avoidable source of greenhouse gas emissions in most Western lives; and energy efficiency, for gobbling up refined crude oil at a rate that would make the eyes of a commodities trader water.

It's fair to say that the industry has been trying. The fuel efficiency of airliners has increased steadily at around 1.2 per cent a year, and is continuing to rise; new tax structures mean that flying half-empty planes will soon become uneconomic, and entrepreneur Richard Branson recently flew one of his planes with one engine operating on a weak blend of biofuel.

All these incremental steps, however, welcome as they are, come in the context of an industry that in the UK grows at a rate of eight per cent every year, and which is predicted to quadruple in size between 1990 and 2050. The simple fact is that if aviation continues to grow as predicted then even with projected increases in efficiency it will use the UK's entire allocation of carbon dioxide by 2050, if we were to accept an 80 per cent reduction target.

Over the next few pages, we examine some of the more radical ideas for making flying green. They range from the scientific to the social, the old to the new, the far-out to the logical. Only one thing is sure: aviation in 2050 won't – because it simply can't – look anything like it does today.

## Which is greenest?

*Grams of $CO_2$ per passenger kilometre*

**1,611** Ship (transatlantic luxury cruise liner, full)

**300** Domestic short-haul flight (including effects at altitude)

**248** International short-haul flight (including effects at altitude)

**210** Average petrol car

**201** International long=haul flight (including effects at altitude)

**199** Average diesel car

**107** Motorbikes

**89** Bus

**60** Rail

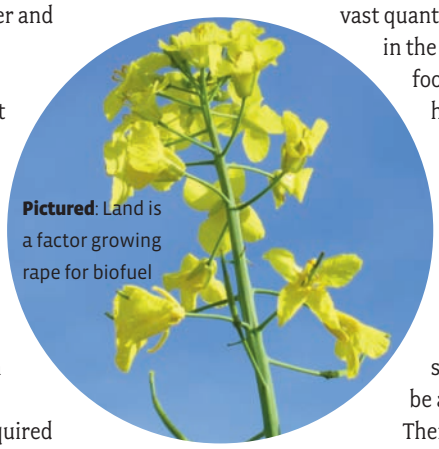
**20** Coach

***Sources:*** *Monbiot, 2006,* Heat: How to Stop the Planet Burning; *Defra, 2007, 'Passenger Transport Emissions Factors'; IPCC, 1999, 'Aviation and the Global Atmosphere', 8.3.3.4*

# Filling up with new fuel

When Richard Branson's Virgin Atlantic 747 flew between London and Amsterdam in February of this year with one engine running on a 20 per cent blend of biofuel made from coconuts and babassu nuts, history was made – but could it become common practice?

The big problem with using biofuels at altitude – both biodiesel and ethanol – is that they clump together and freeze at much higher temperatures than kerosene. This means that they must be blended with conventional jet fuel, making a solely biofuelled plane unlikely in the near future. In addition, because they contain less chemical energy than their fossil equivalents, more biofuel would be required to go the same distance, increasing weight and reducing efficiency.



**Pictured**: Land is a factor growing rape for biofuel

Some quick sums show the real problems with using biofuel to displace kerosene, though. In 2005, the global civil aviation industry burned some 208 billion litres of jet fuel. Replacing just 20 per cent of this with biodiesel from oilseed rape plants would require an area of agricultural land some 436,011km², or just shy of the size of Morocco.

Of course, there are higher-yielding energy crops than rape, and the industry is keen to point towards second-generation or even algae-based biofuels, but trying to supply such vast quantities of plant-based fuel in the face of spiralling global food costs now seems highly unlikely.

So what about using hydrogen to power airliners? The first jet engines were tested using it and, if it could be made using renewable electricity by splitting water, it could be a truly green fuel.

There are two main stumbling blocks. The first is down to hydrogen's physical properties. Since it contains only one quarter the energy of kerosene, more space is needed to store it than conventional fuel. This means larger-bodied planes and hence more drag (air resistance), which in turn leads to more fuel being burned. Proponents of the blended-wing design (see 'New Designs'), however, argue that redesigning aircraft along their lines would allow space for the extra hydrogen, but keeping hydrogen safe and liquid (and hence compact) requires thick, strong tanks and considerable insulation. And somewhere in there we've got to fit some passengers.

The second problem with hydrogen is more thorny. Hydrogen's greatest asset is that, when burned, it creates only water. At altitude, however, this great asset becomes its Achilles heel. Water vapour is the most abundant greenhouse gas, and hydrogen planes would produce nearly three times as much as today's aircraft do. This would lead to more climate-warming contrails if the jets flew at the same level as today, and an even greater impact if the planes flew at supersonic speeds in the stratosphere. The Tyndall Centre for Climate Change Research concludes 'it is difficult to envisage a substantial penetration of hydrogen-fuelled aircraft before 2030-2040'.

# Some joined-up thinking

Besides running his planes on coconuts, one of Richard Branson's other strategies for reducing emissions from aircraft was to tow them to the start of the runway using tugs, rather than have the planes use their engines inefficiently to taxi out. It's a good idea – a plane uses more than twice as much fuel taxiing out on to a runway than it does actually taking off.

Unfortunately, reports suggest the plan didn't work out. Branson's team discovered that repeatedly towing a plane from the gate to the runway by the undercarriage weakened its landing gear. Reinforcing the landing gear or incorporating dedicated towing structures would increase weight and cost – two words airline executives hate.

One easy win for the industry could be the simplification of air traffic control, the system that coordinates the movements of all planes through the sky. Whereas in the US the entire country is covered by one air traffic control system, in Europe there are 34 different zones, all control their own airspace. This leads to serious inefficiencies, with aircraft occasionally being forced on to longer routes or held in 'holding stacks' before they can land, all the while burning fuel.

Coordinating all of these zones into a 'Single European Sky' could reduce the aviation industry's $CO^2$ emissions by 12 million tonnes a year, according to the International Institute for the Environment and Development. The idea has been in the offing for 15 years, however, and the territorial attitude of nations towards their airspace make fast progress unlikely.

# Aviation myth-busters

MYTH **Aviation is only responsible for two per cent of global emissions**

FACT The 'two per cent' figure is one of the aviation industry's favourite statistics. This represents the proportion of global $CO_2$ emissions for which aviation is responsible. In fact, because emissions at altitude are, according to the IPCC, roughly twice as damaging in terms of global warming, this figure is more like four per cent and is rising all the time. In the UK, aviation is responsible for at least 13 per cent of our national emissions.

MYTH **The plane was going anyway, I just got on it**

FACT Airlines, perhaps more than any other transportation industry, monitor their customer demand figures closely. The sector is fiercely competitive, meaning that operators can't afford to ply routes if the demand doesn't exist. In addition, changes made to Air Passenger Duty – the tax all flyers pay to the Government, which come into effect in November 2009 – mean that airlines are now taxed per plane, rather than per passenger. What this means is that there is a much greater incentive to fly a full plane (and hence reduce the overall tax burden per passenger). So by refusing to fly and taking an alternative form of transport, you are very directly increasing the costs of aviation and reducing its popularity.

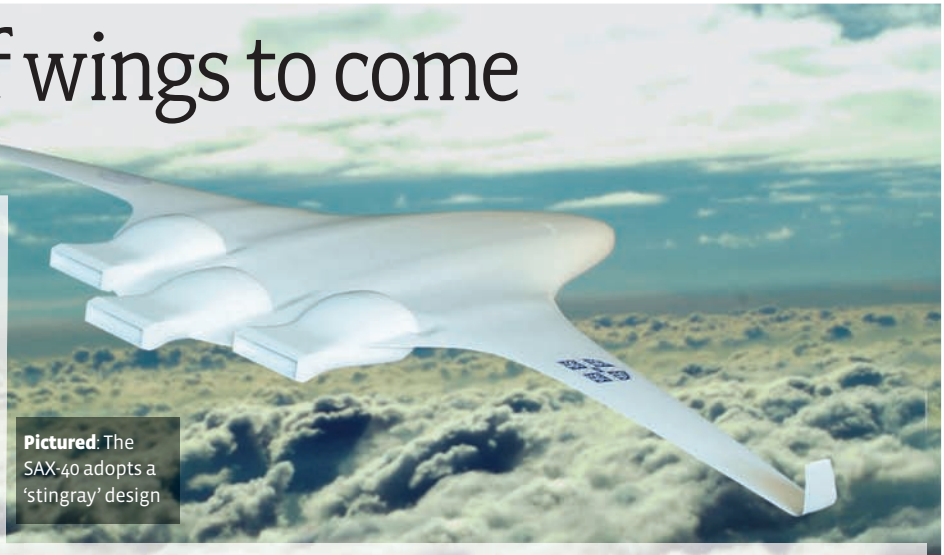
MYTH **Isn't long-haul aviation actually quite efficient?**

FACT Define 'efficient'! It's true that a long-haul flight is probably a more carbon-efficient way of travelling a very long distance than driving yourself there, although much depends on what type of plane or car you board and how many fellow passengers you have. Such a comparison largely misses the point, however: train and coach travel is between three and 10 times less carbon-intensive than air travel, and can be more direct.

MYTH **I'm okay, I offset**

FACT Many offsetting sites, including the Government's ActOn$CO_2$ calculator, fail to account for the impact of greenhouse gas emissions at altitude because of perceived scientific controversy in the area. This means that, despite IPCC agreement that aviation causes between two and four times as much damage as ground-level emissions, you may end up offsetting considerably less damage than you actually cause. There is also a problem with the speed of the offset. In taking a transatlantic flight you can be responsible for pumping a tonne of $CO_2$ into the atmosphere in just a few hours. Depending on which offsetting scheme you use, these emissions could be 'compensated' for at any time in the future – perhaps up to 100 years in the future if you choose a tree-planting scheme. Knowing what we do about the inertia of the global climate system, it's today's emissions we need to worry about the most.

# The shape of wings to come



**Pictured**: The SAX-40 adopts a 'stingray' design

The shape of today's modern airliner hasn't really changed since the 1950s. It's not the most aerodynamic, nor the most efficient, nor the lightest. It's a product of economics and safety, but leaves considerable scope for improvement.

In November 2006, a coalition known as the Silent Aircraft Initiative unveiled computer models of a radical new aircraft shape. Based originally on a 'flying wing' design, the SAX-40 has evolved into something that looks rather like a stingray, with its engines mounted where a tail fin would usually be.

Although the model had been designed with noise-reduction in mind, the Initiative is keen to tout its efficiency credentials. By using the whole body of the plane to create lift rather than just the wings, and through a series of clever aerodynamic innovations, the scientists behind SAX-40 say it would achieve efficiencies of 51g of $CO_2$ per passenger kilometre. Even taking into account the doubling of emissions at altitude, on paper this plane would be more efficient than the average motorbike (107g).

It's an interesting idea, but critics point to the cost of development – between $10 and $15 billion – and the timescale: even the inventors don't expect to see SAX-40 in the skies before 2030. Given aircraft designs tend to have long lives – the Tyndall Centre for Climate Change predicts the Airbus A380 will still be in our skies in 2070 – the blended wing may be too little too late.

# Staying on terra firma

So what about abandoning the skies altogether and accomplishing our long-distance travel some other way? Rail transport has come a long way since the days of Newcomen and Watt, and high-speed rail (trains operating at 300kph or 186 mph) is commonplace in both Europe and Japan. At the start of June 2008, the Liberal Democrats released a new transport manifesto calling for a UK high-speed rail network, with trains running at 225kph on routes such as London to Edinburgh.

As comfortable as high speed rail is, however, debate rages about how to assess the emissions from high-speed rail: do you, for example, take the $CO^2$ figures for the Eurostar and TGV – which run on nuclear-generated electricity – as a benchmark for the UK, where electricity is generated primarily from more carbon-intensive gas and coal? This means no-one can be sure quite what the impact is, but figures suggest that while standard-speed intercity trains emit around 60g of $CO^2$ per passenger kilometre, high-speed trains can emit anything between 69g and 165g $CO^2$ per passenger kilometre – better than a short-haul flight, but not exactly low-carbon travel.

Perhaps IT can be our saviour? Video-conferencing – two-way visual conversations via an internet link – has long been touted as an alternative to business travel, and today's video-conference providers like to talk about 'telepresence' – an experience so real that it feels like meeting the person face-to-face. Because of the infrastructure required, however, it is often necessary to hire a specially equipped room or invest in expensive technology before conferences can take place. Even so, a new report by WWF suggests that 26 per cent of the UK's biggest companies have already reduced their corporate air-miles by using video-conferencing, and more intend to.

# A blast from the past

In light of the huge costs and lengthy development periods of new aviation technologies, investors and the industry have increasingly begun to look at lessons from the past.

In spring 2008, market observers began to notice that sales of turboprop aircraft – propeller planes – were rising. Having been struck off manufacturers' books just a few years ago as technological relics, demand for more fuel-efficient planes led to a sudden resurgence. Two leading plane builders in Canada and France saw their orders for turboprops rise from just 26 in 2002 to 140 this year.

Although they are both slower and noisier (for passengers) than jets, turboprops use between a quarter and a third less fuel, and offer considerably better economy on short-haul flights – one manufacturer claims a full, modern turboprop can achieve fuel efficiencies of 84 miles per gallon – better than a lone driver in a Toyota Prius, though this doesn't take account of emissions at altitude.

Even more radically, veteran environmental campaigner George Monbiot has recently given new wind to the idea of using airships for sustainable aviation. Long-thought to have disappeared with the fiery demise of the *Hindenburg* in 1937, lighter-than-air technology has merely been simmering in the background, waiting for its chance to reappear.

It has some appealing statistics: the Tyndall Centre for Climate Research estimates that an airship would produce between just 10 and 20 per cent of the global warming effect of equivalent aeroplanes, with the possibility of an even bigger reduction if the craft were powered with hydrogen or solar power.

UK-based company the Advanced Technology Group has designed and modelled a 21st-century version of the airship, known as the 'SkyCat'. Looking rather like a fat plane – with a big, swollen hull full of helium but tailfins and rudders like an aeroplane – the SkyCat team believes that the ship could transport as many as 1,500 people at a time, using as little as 30 per cent of the fuel of a conventional aircraft. The craft could travel at approximately 150kph (93mph), which means London to New York in 43 hours – not quite Concorde, but perhaps an acceptable price to pay for an 85 per cent cut in greenhouse gas emissions.

The stumbling block, though, as the company's managing director Michael Stewart explains, is finance.

'The economics of SkyCat are absolutely compelling,' he says. 'The World Food Programme would hire one from us tomorrow if we had one. Unfortunately, we need about $200 million to build the first one, and people with that kind of money tend to be pretty averse to financial risk at the moment.'

Even though the Advanced Technology Group's SkyCat could be used for everything from eco-tourism to oil pipeline transportation – and even with oil at $140 a barrel – the idea remains, as yet, confined to a one-sixth scale model in Cardington, Bedfordshire.

'A full, modern turboprop can achieve fuel efficiencies of 84 miles per gallon – better than a lone driver in a Toyota Prius'

# The runway or the highway?

Can flying ever be green? The answer, surprisingly, is yes: under certain specific circumstances, flying can be a comparatively energy-efficient way of travelling a long distance. Distances in themselves are not the problem, however. The problem is speed.

It is often said that the advent of aviation compressed time. If one business can be on the other side of the Atlantic in six hours then anyone who is any slower will simply lose out. It is the desire for speed that has led to the extraordinary growth in short-haul flights, whereas trains or turboprop aircraft have always provided more efficient and often more comfortable solutions. It is the desire for speed that led commentators to scoff at George Monbiot's suggestion that the airship be re-examined, even though it could transport vast quantities of freight or people, with minimal emissions. And it is the desire for speed that has led to renewed clamour for faster and faster rail services, taking trains beyond the point at which they operate efficiently and supercharging them to get our velocity fix.

The tools and designs for making aviation green are already making their way off the drawing board and into prototypes. What stops them getting further are the demands of the speed status quo. So how best to send a message to the aviation industry that we want change? Find alternative ways to travel. Don't book short-haul flights where any alternative exists and avoid long-haul flights wherever possible. By choosing not to fly today, we spur the innovation and design of tomorrow, make the economics of cheap flights impossible and send the clearest possible message to the industry that the days of climate-wrecking 550mph travel are well and truly numbered. E

'The tools and designs for making aviation green are already making their way off the drawing board and into prototypes'

**Mark Anslow is the *Ecologist*'s senior reporter**

# Natural Mixers

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Are they environmental doom-mongering, journalistic hype or the straw that breaks the camel's back? **William Laurance** examines the complexities of tipping points – those small changes in a natural system that can sometimes provoke sudden and irrevocable collapse

# TIPPING THE BALANCE

**Left**: As the Earth heats up, plants metabolise quicker but grow less, so rainforests such as those in the Amazon may shrink in size
**Below**: The rainforest produces much of its own rain. Less trees means less rainfall. Less rainfall means drier forests and an increased risk of fire
**Bottom**: No one knows at what point the Amazon rainforest will collapse into a rage of droughts and wildfires

Tipping points abound in nature – you can hardly go anywhere without tripping over them. Nature is dynamic. Nature is often nonlinear. Nature is complex and interconnected. All of these features can create tipping points.

In many cases tipping points are trivial. Warm a single ice cube by just a tiny amount, from just below freezing (say, -0.01ºC) to just above it (0.1ºC) and presto! Your ice cube becomes a little puddle. In this context the melt is inconsequential, but imagine crossing the same tiny temperature threshold in Siberia, where some 11 million square kilometres of land – an area the size of France and Germany – are locked up in permafrost. The Siberian permafrost contains hundreds of billions of tonnes of carbon, which has slowly accumulated as frozen peat during many millennia. The peat hasn't decomposed because there is no freestanding water, which is crucial for soil microbes.

When the permafrost melts, however, the microbes leap into action, consuming the peat and emitting as waste products methane and carbon dioxide – both potent greenhouse gases. Suddenly, many billions of tonnes of carbon emissions flood into the atmosphere. Global temperatures shoot up, causing even more permafrost to melt and spew out even more carbon emissions. All we did was nudge the temperature up a tiny fraction of a degree – but we've created a runaway monster.

## Chain reactions

Tipping points can arise in at least three situations. The first is a runaway chain reaction. These usually happen when elements in a system are tightly coupled to one another. Tip over that first domino and a thousand more may quickly fall in sequence. Compress enriched plutonium and you provoke nuclear fission; as each plutonium atom splits in two it shoots out a bullet-like proton that then splits another atom, which in turn fires off another atom-splitting proton, and so forth. If the reaction escalates quickly enough, you get a nuclear explosion.

In the natural world, epidemics are like runaway chain reactions. A sick person infects a few other people, each of whom infects a few others – and suddenly you have a global pandemic. This is especially so with our ultra-mobile modern society, where no pathogen on the planet is ever more than a plane ride away. New pathogens cause deadly epidemics because many people in the population lack immunity and therefore are similarly vulnerable – in effect their fates are tightly coupled, like dominoes ready to fall.

For humans, major epidemics are scary and could potentially kill millions, but epidemics can be even more devastating for wildlife, such as the hundreds of different amphibian species now being driven to extinction by a mysterious chytrid fungus. According to a prevailing theory, this virulent pathogen, which decimates healthy frog populations in just days, might have originated in Africa and humans could be inadvertently transporting its spores around the world.

A second, related cause of tipping points is an abrupt threshold. This is illustrated in the US by the disaster of Florida Bay, the triangular stretch of water enclosed by the south coast of the mainland and the Florida Keys. In the early 1990s it hit a tipping point, changing abruptly from a clear-water system that supported sea grasses and manatees to a murky dead zone overwhelmed by plankton blooms. Nobody saw this coming because nothing seemed to be changing. The bay received a steady stream of pollution from septic systems, but one day hit a critical threshold that turned everything topsy-turvy.

Oceans, too, have scary thresholds. As global temperatures rise, some scientists fear a sudden collapse of the Atlantic thermohaline circulation, a current that brings warm surface water to northern Europe and returns cold, deep-ocean water south. This climatic conveyor belt seems to be slowing (evidently because it is being diluted by freshwater from

melting Arctic and Greenland ice). If it collapses altogether it could lock northern Europe into a deep freeze while destabilising the north-Atlantic climate. The last time this conveyor belt failed, some 8,200 years ago, the land temperature of Greenland fell by more than 5°C.

Still another threshold involves the acidity of the oceans. As carbon dioxide accumulates in the atmosphere, some of it dissolves in the oceans, elevating acidity and changing water chemistry. Ocean acidity has already risen by more than 25 per cent above pre-industrial levels. Greater acidity makes it harder for many marine organisms, such as corals, sea urchins, starfish and winged snails, to form their crucial skeletons or shells. In just decades, some scientists believe, the oceans will hit an acidity threshold that will kill many cold-water species, with acidic conditions spreading soon afterward into warmer waters.

The final cause of tipping points is positive feedbacks. These self-reinforcing feedbacks are reminiscent of a Russian slapping contest, where the two opponents take turns smacking each other, always hitting their foe a little harder than they were slapped. Self-amplifying situations such as this can quickly spiral out of control.

### Positive, negative

The Amazon rainforest appears vulnerable to an alarming positive feedback. The rainforest generates much of its own rainfall – which is crucial for the forest's survival – because the dense vegetation quickly recycles moisture and returns it to the atmosphere. As deforestation proceeds, however, less water vapour is recycled, so clouds and rainfall decline. As the forest dries out, wildfires increase and destroy yet more forest, further depressing rainfall. No one knows how far the Amazon can be pushed before it collapses in a rage of droughts and forest fires.

Tropical forests might be susceptible to another kind of positive feedback, according to a prominent but controversial theory. Long-term research in Costa Rica suggests that plant growth in undisturbed forests declines in warmer years. This could be because the metabolism of plants rises with higher temperature, much in the same way as cold-blooded lizards speed up in warm weather.

To increase its metabolism, a plant has to burn more energy, and so less energy is available for growth. Hence, as the Earth heats up, rainforest plants may grow ever

## The 'known unknowns'

Climate scientists agree that there are several known tipping points... what they can't agree on is how urgent or influential they are:

- **Arctic summer sea ice**
Sea ice extent is already decreasing, but total loss would devastate Arctic ecosystems. Sea ice loss also can accelerate warming because ice is more reflective than open water. If not already passed, it may be very close; a transition could well occur within this century.

- **Greenland ice sheet (GIS)**
A total meltdown of the GIS, which data suggests could occur at average global temperatures 1-2°C above present, would eventually raise sea level about 20ft.

- **West Antarctic ice sheet (WAIS)**
A collapse of the WAIS would eventually raise sea level about 15ft, raising sea levels much more rapidly than the GIS.

- **Atlantic thermohaline circulation (THC)**
Significant slowing or a complete shut-off of circulation patterns in the Atlantic Ocean would affect regional climate patterns, since the THC transports heat from the tropics to Northern Europe.

- **El Niño southern oscillation**
El Niño causes warm water to move eastward so the Pacific Ocean releases more heat. Stronger El Niño events due to global warming would, for example, bring drought to Southeast Asia.

- **Indian summer monsoon**
Land use changes and pollution can increase regional albedo, or reflectivity, which further increases as a surface gets brighter. Higher albedo weakens the monsoon – disastrous for India, which depends on the rainfall for irrigation.

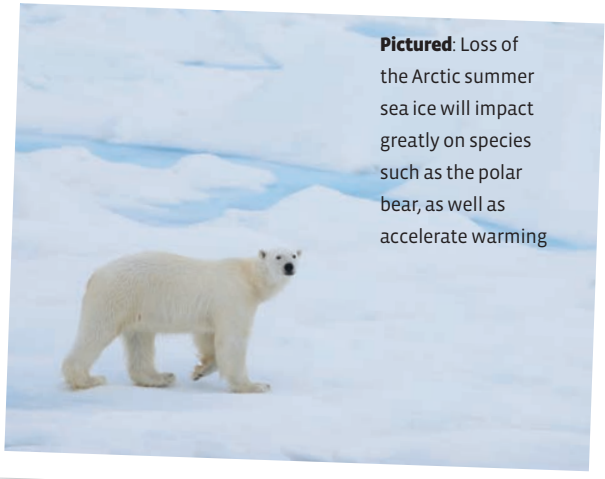
- **West African monsoon**
Rainfall in Africa's Sahara and Sahel regions could increase, leading to greening. This might harm plants and animals adapted to current conditions, but the societal impact could be very positive – a rare potential benefit of climate change.

- **Amazon rainforest**
Warming and land use changes could decrease precipitation and lengthen the Amazonian dry season, leading to forest dieback. Deforestation can accelerate warming, exacerbating the problem.

- **Boreal forest**
The vast boreal forests of Canada, Alaska, Europe and Russia store carbon, filter water and support many rare flora and fauna. As the forests become drier they are more vulnerable to fire and disease.

- **Release of stored methane**
Huge amounts of methane, a highly potent greenhouse gas, are stored in the permafrost in Siberia and North America. The continental shelves also contain vast quantities of methane ice, which are released as temperatures rise.

- **Ocean acidification**
The waters along the Pacific coast are becoming more acidic, much more quickly than scientists had expected as they absorb $CO_2$ from the atmosphere. This produces an overabundance of phytoplankton, which introduces even more atmospheric $CO_2$ into the system as it decomposes.



**Pictured**: Loss of the Arctic summer sea ice will impact greatly on species such as the polar bear, as well as accelerate warming

# Tipping towards balance

**Tipping points don't have to be negative. The EcoTipping Points Project focuses on the positive impacts small changes in communities are having on their environment. Like a single person using a lever to lift a car, a little change in a society's practices can have a big effect.**

**Increased fishing pressures cause fish populations to decline. When a village establishes areas in which fishing is prohibited, it gives fish populations a chance to increase, making fish more abundant. This helps local communities that depend on fishing, who then see the importance of preserving habitats and will do more to help them in the future.**

**In a small farming village in India water was becoming scarcer as wells ran dry. In the past the groundwater in aquifers was restored via pond-like johads, which kept monsoon rains on the land long enough to soak in. Logging in the area led to erosion, which filled the johads with silt. A group took up the task of digging out a johad and the nearby wells filled again. More water led to more plants, which prevented erosion and fed the village. The villages revived more johads.**

**The EcoTipping Points Project looks to help more communities turn the tide of environmental decline and find a sustainable way of living that benefits both them and the planet. For more stories of inspiring environmental change for the better on a local level, see www.ecotippingpoints.org.**

more slowly. If these observations are correct, rainforests will actually shrink in the future, progressively becoming dominated by smaller, slower-growing trees as global temperatures rise.

Why is this important? Tropical forests store vast quantities of carbon in their dense vegetation – more than any other forest type on earth. If the rainforests are literally shrinking, they could emit billions of tons of carbon into the atmosphere. This, in turn, would accelerate global warming, which would make rainforests shrink even faster – a positive feedback. In a hotter world, even protecting a rainforest within a national park might not ensure that its carbon is safely locked away – though this is surely better than no park at all, because unprotected rainforests are often razed to the ground.

## Into the unknown

As we've seen, at least three situations in nature can create tipping points. First, uncontrolled chain reactions can be unleashed when the elements in a system are tightly linked, like a line of falling dominoes. Second, nonlinearities can generate abrupt thresholds – the proverbial straw that breaks the camel's back. Finally, runaway positive feedbacks, like a pair of slap-happy Russians, can easily ensue when two or more phenomena amplify each other.

But perhaps the scariest thing about tipping points is that they are devilishly hard to predict. Donald Rumsfeld, the former US Secretary of Defence, must have had tipping points in mind when he famously distinguished between 'known unknowns' and 'unknown unknowns'. Known unknowns are like the impacts of global warming on cold-adapted species: we know they're happening, even if we can't predict their ultimate effects. Many tipping points are unknown unknowns, however; they can come at us completely out of the blue, with no warning at all.

Because of their inherent unpredictability, tipping points are a daunting challenge for decision-makers. The influential Intergovernmental Panel on Climate Change (IPCC) has downplayed the influence of some tipping points, such as the possibility that the Arctic and Greenland ice sheets might quickly collapse, or that global warming will magnify El Niños and thereby increase droughts in many parts of the world.

Some leading researchers, however, such as Tim Lenton of the University of East Anglia and his colleagues, have challenged this view, arguing that several climatic tipping points are more likely than suggested by the IPCC. Likewise, a respected team headed by Peter Cox of the British Met Office in Hadley has asserted that the Amazon is more vulnerable to future droughts than the IPCC proposes. Much blood is being spilled on the floor as IPCC scientists and governmental representatives debate how to deal with tipping points in their technical reports. But because they are subjected to multiple reviews, in which controversial issues are mercilessly axed by dissenting nations or scientists, IPCC reports are inherently conservative, especially when it comes to tipping points.

Risk-management experts and insurers are also struggling with tipping points, given that destructive storms, floods and crop-killing droughts might abruptly increase in the future. They are further worried because many different phenomena, which affect and are affected by the environment, can also have tipping points.

For example, one reason stock markets are so volatile is that stock traders have a herd mentality – buying and selling in unison. In effect, they're like nervous wildebeest, ready to panic and stampede when bad news

arrives. Under these conditions, even small disturbances, such as a spike in energy or food prices, can sometimes generate major economic shocks that reverberate across the planet. In an effort better to predict such rare, shattering events, some risk-management experts are even exploring new fields of mathematics – but the challenge is daunting.

## Expect the unexpected

Despite our best efforts, there is only one real certainty with tipping points: expect the unexpected. Nevertheless, all is not hopeless. While it can be fiendishly difficult to predict specific tipping points, we now understand some key factors that make them more likely.

One key risk factor is increasing globalisation, which creates complicated economic and environmental linkages across the planet. Rising demand for furniture in the US and Europe is driving an expansion of Chinese furniture manufacturing, for example, which in turn is causing a spike in illegal logging in developing nations in Asia and Africa that export their logs to China. In a complex, interconnected world, yanking on a string in one location can cause painful jolts in far-flung and unpredictable places.

Globalisation is risky for another reason. It promotes centralisation and eliminates 'redundancy', because those able to produce a product or service most cheaply tend to eliminate less-efficient producers. While this has certain economic benefits, it also magnifies the chances a small disturbance will quickly snowball into a bigger crisis. In 2003, for instance, North America and Europe were slammed by major power blackouts that arose when small nodes in the electrical grids failed. Had their electrical systems been less centralised with more redundancy, they would have been far more resilient in the face of small, local disturbances.

Tipping points also become far more likely when a system is stressed, and the Earth today is a poster-child for stress. With our burgeoning population and escalating demands for food, energy and goods, and with seismic changes in our increasingly globalised economy, we are stressing our planet in countless alarming ways. Environmental and economic shocks are not just a possibility in the next few decades – they are practically guaranteed.

Though hard to predict, new catastrophes are certainly coming, so we must plan and save accordingly. If we wish to survive future tipping points we need to prepare seriously for them, by keeping some of our resources in reserve. We also need to reign in globalisation, especially with the environment potentially at risk. A far broader public debate is needed on globalisation, because so few economists are trained to understand its real perils. Finally, we must take our foot off the economic accelerator, to reduce the intense and varied stresses on our global environment.

With tipping points we really are in fearsome, uncharted waters. Let's be careful that we don't sink. E

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# Taking a swing at golf

It's been described as a 'good walk spoiled' and while an afternoon's golf might seem to be a fairly green way to pass the time, as **Eifion Rees** finds out, the golfing world's eco credentials are simply full of holes

It's early morning on the first tee. Two players stroll leisurely across the perfectly mowed turf to line up the first shot of the day. Before them stretch acres of lovingly tended fairway, carefully manicured rough, trees and water features. The sprinklers are on in the distance; rainbows are forming in the fine mist. Everywhere is green and lush. Welcome to Egypt. Welcome to Saudi Arabia. Welcome to Afghanistan.

There are golf courses in 140 countries worldwide – 600 under construction at this very moment – and not all are as suited to the sport as inclement Scotland, where the game originated. Mature markets like the UK, US, Ireland and Australia may not be expanding, but the sport is still growing in the rest of the world. It has been exported to jungle nations, its courses carved from tropical rainforests, and to some of the driest places on Earth.

Golf is the thirstiest sport in the world. Some 9.5 billion litres of water are used daily to keep greens green – enough to meet the needs of four-fifths of the Earth's population for a day. US courses are conservatively estimated to use an average of 300,000 gallons daily – Las Vegas's 60 courses each uses a million. Working in Arizona, a greenkeeper from Scotland was shocked to see what would have been his yearly usage of three million gallons used in the course of a single night.

Joan Taylor, vice chair of the California/Nevada Desert Committee of environmental organisation the Sierra Club, believes golf's water use in dry areas is neither tenable nor defensible. 'Here in the Palm Springs area, astounding amounts of water are poured on golf courses – half a million gallons a day per course, times more than 100 golf courses,' she says. 'Not only is this an unspeakable waste of potable water, it's also unsustainable. Southern California is a desert, and the snow pack on which we rely for water is steadily dwindling.'

'Half the population of the Dominican Republic lives below the poverty line, yet the country has two-dozen golf courses'

Because of premiums on drinking water it can prove more cost-effective to use treated effluent, or grey, water, but if the quality is low and salt content high this can cause problems with the turf – meaning the difference between an eagle and a bogey. New strains of grass are increasingly being used that can survive on less water; seashore paspalum grass, a salt-resistant hybrid, can be irrigated with recycled or brackish water, but in countries such as Egypt, Saudi Arabia and the Dominican Republic this still means wastage somewhere along the line. Droughts are common in the Dominican Republic, for instance, and half the population lives below the poverty line, yet the country has two-dozen courses, the most of any Caribbean nation.

Water rights are also an issue in the US, where it's possible effectively to buy first place in the queue – senior water rights – leaving those with less clout to make do with less water of a lower quality. People in other parts of the world aren't as happy to allow the authorities to put their health and that of the environment on the line.

In 1995, residents of the Mexican town of Tepoztlan halted the construction of Club de Golf El Tepozteco, a business complex and 700 luxury residences, each with a swimming pool, built around a Jack Nicklaus-designed golf course. The complex was to have been built in an ecological reserve above the aquifer supplying the town's water. Environmentalists estimated the golf course alone would need 525,000 gallons of water a day; others put the figure at 800,000 gallons, five times the town's consumption. One man was killed when police opened fire into a crowd of protestors. Jack Nicklaus told *Golf Digest* at the time: 'I was told there was some uprising, but I didn't know. I just don't get in the middle of it.' Nicklaus Design has 17 golf courses in Mexico; its website lists another 17 as 'under construction'.

### Putting golf into perspective

Golf originated in Scotland (ironically, it is first mentioned in two 15th-century Scottish laws that prohibit its playing) and as a sport it is

certainly well suited to the British weather. There are 2,500 courses in the UK, more than 32,000 worldwide and 59 million golfers chipping and putting internationally – roughly the population of the UK. The billions they raise in revenue go some way to explaining golf's global spread to places as incongruous as Kazakhstan and Nicaragua, and as questionable as Burma and Afghanistan.

Half the world's courses and golfers are in the US, and they spend $24.3 billion on green fees and equipment, according to the US National Golf Foundation. A further $26.1 billion goes on golfing travel, hotels, food and drink. If you thought golf was just about hitting a ball with a stick, think again.

'Golf is fantastic for bringing tourism into a country and selling real estate,' says Colin Hegarty, president of the Golf Research Group, a believer in the economic good the game can bring. 'Developers will typically buy 4,000 acres and put in a masterplan over 20 to 30 years. 160 acres will be for golf – it's just the space between the houses.'

By its very nature, golf is an exclusive sport. Lush fairways and air-conditioned clubhouses are accessible only to those who can afford the membership fees; gates and fences keep out the rest. Golfers the world over are nature lovers – they just want to love it in isolation.

Building a course costs between £4 and £6 million, and involves moving vast quantities of soil, quantities that have increased as the technology – from digging machinery to the clubs and balls that enable golfers to hit further – has improved. Some bigger courses require the shifting of 750,000 cubic metres of earth, according to the Worldwatch Institute. Developers unveiling the most recent phase of the Cap Cana resort in the Dominican Republic, which features three Jack Nicklaus Signature golf courses, described their development as 'nature improved by man'. Bulldozers were required to 'improve' the site of 35,000 acres of mahogany forest before building could begin.

The average golf course is some 75 acres in size, meaning globally approximately two and a half million acres of land have been given over to the sport, though in some parts it is currently lying fallow. Golf mania gripped Asia in the 1990s, but Japan's boom in courses fell foul of the financial bust of 1997. The same is true of Thailand and Malaysia, which bought wholesale into golf and the lure of golf tourism.

'With the same pattern of overkill development seen in other countries, exclusivity has given way to a glut,' says Chee Yoke Ling, legal adviser and environment coordinator of the Third World Network. 'The first phase is golf as luxurious and elitist, followed by an overdevelopment phase and then a desperate promotion to fill the hotels and fairways. A small country like Malaysia has more than 200 courses, many of which are tied up with hotels. Thailand has more courses and has been promoting golf tourism even more aggressively. It is ironic and tragic that Malaysian companies are now targeting the Thai market.'

## Social apartheid

Golf has always had an eye for scenery: the more beautiful a location, the more paying visitors it can attract. Along the Garden Route, on the southern tip of South Africa, the price of land has trebled in the past five years as a result of a rush to develop elite resorts. A decade of environmental opposition has yielded little joy; the sheer numbers of courses springing up in the region even less – not for nothing is it known as a golfer's paradise. The Pinnacle Point Golf Estate goes so far as to call itself 'golf's new garden of Eden', though its

## Teeing-up on the taxpayer

In 1975, the US Department of Defense spent $14 million a year to maintain the 300 golf courses it owned around the world. In 1996 the number of taxpayer-funded, military-run courses had apparently dropped to 234, and today the US military claims to own only 172 worldwide, although a new book – Nick Turse's *The Complex: How the Military Invades our Everyday Lives* (Metropolitan, 2008) – uncovers some dodgy maths.

Not only do the US Air Force's claimed 68 courses, the navy's 37 and the army's 56 courses count separate golf courses as single ones (the kind of creative leisure accountancy that sees three 18-hole courses become one), but they also miss some off the list entirely – the Tournament Players club in Mosul, Iraq, for example, or the navy's course at Guantanamo Bay, Cuba. No mention is made of the army course on Kwajalein, in the Republic of the Marshall Islands, home of the Ronald Reagan Ballistic Missile Defense Test Site. And what about its nine-hole course on Diego Garcia, the British territory whose native population were forcibly evicted to make way for the vast US military base 'Camp Justice'?

If keeping track of its golf courses accurately has proved a mission too far for the Pentagon, however, applying for public money for their upkeep seems a much more straightforward affair. In 2004, according to Turse, the US army paid out $19,000 to the Lakeview Golf Resort and Spa in Morgantown, West Virginia, $48,620 to the Arizona Golf Resort and Conference Centre in Mesa, Arizona, and $71,614 to the Arizona Golf Resort – in Riyadh, Saudi Arabia. Other expenses billed to the American taxpayer that year included $6,860 to Golf Car Company, $16,741 to Southern Golf Cars and $37,964 to Golf Car Specialties. A couple of years later two golf cart companies received almost $60,000 from the Department for Defense, while a German golfing supplier received $88,000 from the Pentagon.

The extent, expense and relative lack of publicity about the American armed forces' obsession with golf may be shocking, but their latest foray into the 'military-leisure complex' could be slightly more difficult to conceal. In partnership with an international consortium, the Pentagon is planning a $5 billion tourism and development scheme inside the Green Zone in Baghdad, including shopping malls, hotels and – of course – a golfing resort. Locked away behind 10km of blast walls and barbed wire, the Tigris Woods Golf and Country Club may just prove to be the most exclusive golf course in the world.

local reputation points out the hyperbole.

'At Mossel Bay, Pinnacle Point Golf Estate has broken all the planning rules and developed to the edge of the cliffs,' says Angela Conway of the Southern Cape Land Committee. 'Now the run-off is destroying an archaeological site. The local community is fighting to regain use of Souweisia, a municipal beach put out to tender to developers. At Noetzie, Pezula Golf Estate tried to close off public steps to the beach. German investors Fancourt have bought up three more smallholdings to incorporate into their elite golf estate.'

Conway warns locals are becoming increasingly frustrated at the ongoing privatisation of their coast, but that the income-generating potential of such resorts has political backing. The 2,000-acre Lagoon Bay Lifestyle Estate – two golf courses, 1,000 residential properties, a hotel and a shopping village – has been earmarked for land that a Department of Agriculture report said had 'high agricultural potential'.

'A few months after the report, the Minister for Agriculture pronounced the land unsuitable for agriculture,' says Conway. 'Lagoon Bay will command a huge chunk of coastline and will mean wall-to-wall golf estates from Pacaltsdorp to Great Brak. The development has support high up, however, which may just override environment and planning officials.

'I do not think the public is even aware more golf estates are planned. Public participation by developers seeking land has been poor; they have mainly targeted poor people, promising them the moon. Agricultural land continues to be converted into elite resorts.'

### When is a green not green?

The Worldwatch Institute estimates that six times as much pesticide is used on golf courses as on agricultural land, and also observes an impact from numerous fertilisers, remarking that run-off 'can lead to eutrophication [the introduction of excess nutrients] of nearby surface waters'. In 1994, the University of Iowa College of Medicine examined the death certificates of more than 600 golf course superintendents and found a disproportionately high number had died from cancers including brain cancer and non-Hodgkin's lymphoma, associated with pesticide poisoning. Jim Snow, a director of the US Golf Association (USGA), has warned golfers against putting tees in their mouths for fear of poisoning.

It's undoubtedly true golf courses use less chemicals and pesticides than they once did, but that doesn't necessarily make them green – sometimes even if they've been certified as such. The USGA *Guide to Environmental Stewardship on the Golf Course*, for example, recommends courses 'consider the use of reclaimed water for irrigation' and 'protect sensitive habitats during construction'. The guide was prepared by Audubon International (AI) – not to be confused with conservationists the National Audubon Society. In 1991, the latter failed in a legal bid to get AI (busy bestowing 'Audubon' accreditation on golf courses across the US) to change its name. AI is financed for the most part by the USGA.

Mario Rodrigues, a golf researcher and

editor of Mumbai-based *All Sports Magazine*, says chemicals are part and parcel of the golfing package: 'These industries are linked, particularly in the US, and as long as new golf projects come with a heavy chemical pesticide-based component, golf will continue to pose an environmental hazard. Efforts to regulate its ill effects will only be partial and the question why harmful chemical pesticides for courses can't be eliminated totally or to the maximum extent possible will not be addressed.'

## A chemical Passover

Is there any way to keep fairways weed-free and use less pesticide? The Scotts Miracle-Gro Company thought it had found one. Its solution was to genetically modify grasses to withstand a single pesticide; spraying would result in a kind of chemical Passover, sparing the golf turf and nothing else. The pesticide was a solution called Roundup.

Creeping Bentgrass and Kentucky Bluegrass are two robust, weedy perennial grasses designed as golf grasses and genetically engineered to withstand Monsanto's leading weedkiller, generically known as glyphosate. Passed fit for testing by the US Department of Agriculture (USDA), these grasses were planted in a trial site in Oregon in 2003. It may have been tempting fate to trial them so close to a protected National Grassland.

Grass pollen can travel huge distances and there were fears that naturally occurring grasses could become contaminated, creating superweeds with increased resistance to pesticide, requiring more toxic substances to cope with the problem. In 2004, scientists found genetically engineered bentgrass pollen 13 miles downwind of the 600-acre test site. In a new study two years later, nine genetically engineered plants were found growing in the vicinity, the furthest almost three miles away.

The Center for Food Safety successfully sued the USDA in February 2007 for allowing the field trials of the Roundup Ready golf grass to proceed without having done a serious environmental assessment. Scotts was fined $500,000. Its appeal against the decision was thrown out of court in March 2008.

George Kimbrell of the CFS is under no illusions about the importance of the 'perfect' golf grass to Scotts and companies like it.

'Scotts claimed the grasses were crucial to its biotech programme – to the tune of tens of millions of dollars – and that our legal victory should be overturned because it had created a 'dark cloud of regulatory uncertainty' over the future of its biotech grasses.

'The legal victory has forced the federal government to take a longer, harder look at the significant potential and novel environmental harms from these grasses, but Scotts will continue to try to get genetically engineered grasses deregulated.'

'The Lagoon Bay development has political support high up, which may just override environment and planning officials'

From water to land use, pesticides and fertilisers to genetically modified grasses, golf's environmental footprint is as vast as its fairways. Although a sport adapted to some countries in the world – those with high rainfall and where environmental regulations exist to rein in its worst excesses – it is one whose impact seems disproportionate to the number of players of the game.

'Golf courses evolved in Scotland, not in the Sonoran Desert,' the Sierra Club's Joan Taylor points out. 'There is no such thing as an "environmentally friendly" golf course. Some may just be a little less unfriendly than others.' E

**Eifion Rees is a freelance journalist**


Illustration: MATT LITTLER

# Designing for Destruction

Isn't anything built to last anymore? **Nick Kettles** examines the scandal of planned technological obsolescence and the global impact of the cult of the landfill designer

Our enormously productive economy demands that we make consumption our way of life, that we convert the buying and use of goods into rituals, that we seek our spiritual satisfaction, our ego satisfaction, in consumption... We need things consumed, burned up, replaced and discarded at an ever accelerating rate.'

Little has changed since retail analyst Victor Lebow made this eloquent paean to our juggernaut, throwaway society in 1955. Just 18 months ago President George Bush responded to fears of a US recession, with a paean of his own: 'I encourage y'all go shopping more.'

Poetic or not, both statements reveal a fundamental truth: that it is consumption, not production, that powers our economies. It's arguable this has delivered an unprecedented increase in the standard of living, but at what cost?

According to international sustainability expert Annie Leonard, creator of the wonderful film *Story of Stuff* (www.storyofstuff.com) the amount of products that remain in use six months after purchase is a pitiful one per cent. Each year in Europe around seven million tonnes of electronic waste is generated, and in spite of the new Waste Electrical and Electronic Equipment regulations, much is still finding its way to landfill. Then there's the waste, or 'embedded energy', produced in the production process. Scientists have estimated that producing a single computer chip, weighing but a few grams, requires 1.7kg of fossil fuel and chemical inputs, and 32 litres of water. In *Natural Capitalism*, authors Paul Hawken, Amory Lovins and Hunter Lovins note the manufacture of a single laptop computer requires inputs close to 4,000 times its weight.

And the secret sauce in this orgy of hyper-

consumption we're dining on? 'Planned obsolescence' – a notion made popular in the 1950s, to describe the theory that many products were and are effectively 'made to break' before the consumer expects them to. Computers that can't be upgraded because in preceding years the shape of components have been changed; disposable razors with indicator strips that tell you to change the blade, even if it's still good; and of course the iPod that Apple openly admits is only designed to last three years, if you're lucky.

Giles Slade, author of *Made to Break*, claims the iPod's lithium batteries begin to lose their peak functionality after a year of use. They are also so small it's too expensive to disassemble them, and in spite of Apple's wholesome in-store recycling program, many of the 40 million sold end up in landfill poisoning the groundwater with lead, mercury, cadmium, chromium, and barium.

So why is it, even though it's now understood up to 80 per cent of the environmental impact of a product is defined at the design stage (a figure backed by the Department for Business, Enterprise & Regulatory Reform), that designers continue to come up with such products? And if they can design a disposable society, why can't they design a sustainable one?

In his book, *Earth in Mind*, David Orr says: 'Designers are incredibly powerful. We have a hand in creating the communications, experiences and artefacts that comprise our world, and we have an increasing influence upon the decisions affecting the quality of life for millions of people.

'We are increasingly aware that the cumulative effects of our "designs" are harming the planet in ways that may be irreversible. How can we begin to harness the power of design to contribute to the large problems confronting society that have big consequences?'

At face value though, it seems many designers are resigned to remain helpless cogs in the machine; 'fixers' who guarantee a return on capital investment.

One of British graphic designer Jonathan Barnbrook's provocative posters proclaimed that 'designers are falling over each other to kiss corporate ass'. Another designer at Pentagram Design, which builds portable devices and computers for companies such as HP, told *The Wall Street Journal*: 'We joke that we design landfills.'

Still more sinister is the way designers continue to perpetuate 'psychological obsolescence', another way of describing products designed to become obsolete in the mind of the consumer, even sooner than the components used to make them will fail.

**'Even if the phone is recycled it might be shipped to India, where children sift through piles of toxic waste for components to resell'**

Was Paul Smith's design house conscious of its role in perpetuating the 18-month life-cycle of mobile phones when it decorated the LG Electronics LV3000S Crystal Edition mobile phone with jewelled crystals over a fabric-wrapped exterior to meet the whims of Korean consumers who view personal electronics as fashion accessories? Or, aware that even if the phone is recycled it might be shipped overseas to somewhere like India and China, where children and the unemployed sift through piles of electronic toxic waste for components they can resell?

Designer Terry Irwin, a former director overseeing 75 designers at agency Metadesign, says: 'Cell phones as fashion accessories are the ultimate contradiction in design: ephemeral products made of "permanent" materials. Ultimately, what is being sold is style and image, which is fleeting. Everyone wants to project the right image and that image needs constant updating.'

In a new, more sustainable world, design and designers have a key role to play. If the Climate Change bill's ambitions to reduce carbon emissions by 60 per cent by 2050 are to be taken seriously then design will have to move beyond being a beauty contest and return to its original purpose: primarily as a problem-solving exercise, in which profit is not the sole determining parameter.

To date, however, it's not been easy for designers to define what they can do within a sustainable framework.

Irwin says that with design embedded within dominant economic and business paradigms, the role of the designers will always be more purveyor of style than architect of meaningful solutions. This often plays into designers' own desires to be cool and win awards, and is compounded by the fact many also consider they should have the same creative license as artists, and therefore can ignore the social, political or ecological responsibility of what they do.

**'Designing more efficient engines results in the likelihood vehicles will be driven further, meaning more energy consumption'**

Professor John Wood of Goldsmith College thinks designers are caught in a vicious circle. 'It was inexcusable that the UK Government's 2005 Cox Report on Creativity in Business made no mention of ethics or sustainability,' he says. 'And if industry treats designers like mercenaries, it's hardly surprising that most simply do what they are paid to do. If governments have failed to meet their own dismal targets on greenhouse gases, why should designers shoulder the burden by being more strategic, devious and far-sighted than the so-called experts?'

But John Thackara, author of *In the Bubble: Designing in a Complex World* says ignorance of the bigger picture is no longer a valid excuse: 'Given what we know today, if a designer does not act with sustainability in mind, she acts, by default, against it.'

### Short-circuiting planned obsolescence

The most obvious design response to planned and psychological obsolescence is the design of products and systems that allow us to slow down, step out of the rat race and enjoy products that embrace the utilitarian values of the arts and crafts movement of William Morris. This is the impulse at the heart of the downsizing movement.

Carl Honoré, author of *In Praise of Slow*, calls this Slow Design, an antidote to the curse of the here-today, gone-tomorrow culture: 'It's about making objects that carry with them a story of how they were conceived, made and distributed. Slow Design means filling the world with objects that nourish and inspire.'

Beautiful as it may be, however, built-to-last is just one approach to sustainability. Life today

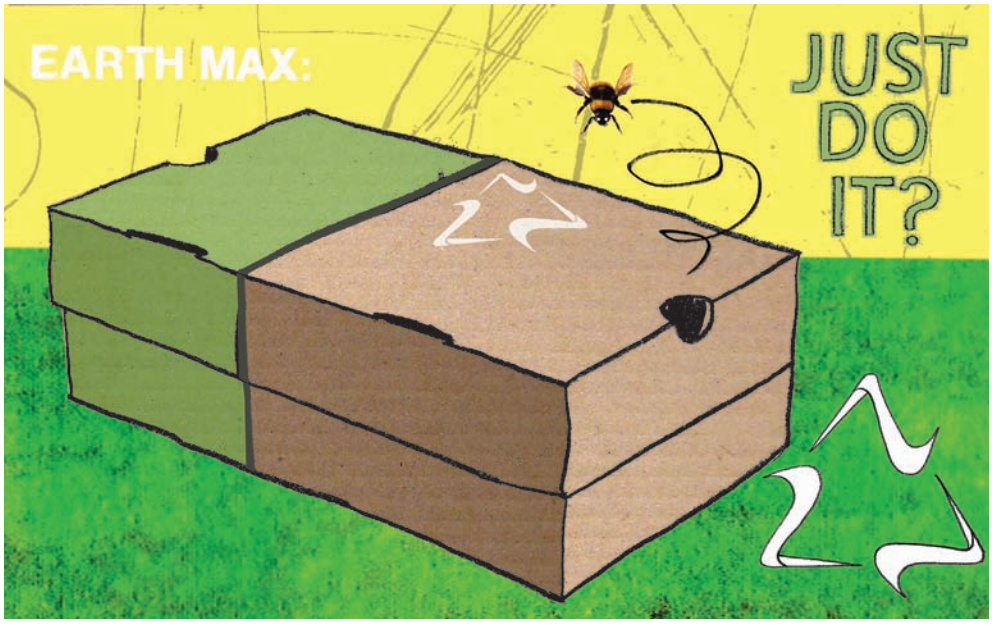



Illustration: MATT LITTLER

is far more complex than a return to prewar values of thrift, utility and resourcefulness, may be able to resolve. As William Morris himself discovered, built-to-last is not always market-friendly – not everyone can afford something that has taken hundred of hours to make by hand.

Moreover, as culture commentator Stephen Bayley points out, it's possible to argue that a Ferrari, which is partly hand-made and aligned with similar values, is less damaging than, say, a hybrid car such as the Toyota Prius: 'Ferraris use less energy to manufacture, and most of the few people who own one only drive 1,000 to 2,000 miles a year. And Ferraris last forever. Once made, they are never scrapped. The Prius, by contrast, (while ingenious) is immensely costly to manufacture and since its batteries are only guaranteed for 60,000 miles, most owners will scrap the cars at that mileage,' he says.

Provocative for Prius owners, to be sure, but as Robert Bryce, author of *Gusher of Lies: The Dangerous Delusions of 'Energy Independence'* underlines, greater energy efficiency alone won't deliver energy salvation. The simple fact is that designing more efficient engines that offer more miles to the gallon results in the likelihood vehicles will be driven further, and used in a wider range of applications – light aircraft, recreational boats, mowers – all of which means still more energy consumption.

To move beyond the short-term task of fixing what's wrong now, to creating a sustainable society that can last many hundreds of years, requires more than one approach, and the role of designers in helping businesses embrace the notion of extended producer responsibility at a more fundamental level is essential.

Big business must play its part, too, and do more than the piecemeal change of greenwashing tactics designed to prove eco-credentials, such as Coca-Cola's lightweight bottle, B&Q's reusable worktop delivery packs and Ariel's 'Turn to 30' campaign.

We need to close the circle so there are not only consumers who want it, businesses that recognise its competitive advantage, but also designers who can design it, too.

New EU eco-design legislation suggests a trend that may force their hand. The Energy Using Products Directive – which focuses on improving the design of electrical goods' 'stand-by mode' to make them more energy efficient – represents a bold step forward, by enshrining in law an extension of the traditional performance-versus-cost design equation, embracing the hidden costs caused by the environmental impact of a product.

Leading figures within the 'design' industry are also beginning to question the idea of what should qualify as good design, and how it should be described.

Design Council CEO David Kester, who previously worked at Friends of the Earth, says redefining good design would help drive new patterns of consumer behaviour: 'If we go back to the roots of the Design Council, it was launched to help move the economy beyond the ration-book economy and thrift culture of the Second World War.

'By putting the Design Centre marque on a new product, it encouraged people to dispose of older – but possibly still functional – products, and purchase something new,' says Kester. 'Today we've come full circle, and now we need to play our part in shaping a new market. We are interested in developing a new marque, within the next year, which reframes the notion of "good design". "Works well plus looks good" is an old-world value. Today, "works well and looks good" must be weighed against its impact on people and the planet.'

### 'Cradle to cradle' theory

In 1965, economist Theodore Levitt's essay 'Exploit the Product Lifecycle' set the foundations for the idea of 'designing for disassembly', or 'green design', by drawing an analogy between Darwinian extinction and technological obsolescence. This idea later bore fruit in William McDonough and Michael Braungart's Hannover Principles, which call for the transformation of human industry through ecologically intelligent design – so called 'cradle to cradle' production techniques, which are not just efficient but essentially waste-free. By contrast, cradle to grave refers to companies only taking responsibility for the disposal of its goods, not necessarily putting its constituent components back into service.

In their book *Cradle to Cradle: Remaking the Way We Make Things*, McDonough and Braungart use a cherry tree as an example, noting how each year it dumps a great pile of fruit and leaves on the ground to rot. This appears wasteful, but all of it actually goes back into nature to be reborn as new trees, bacteria, birds and other parts of the natural ecosystem. Instead of trying to do more with less, McDonough and Braungart say we should try to emulate this natural system. By creating products composed either of technical

nutrients that can be reused or re-purposed with no loss of quality, or biological nutrients, which can be composted or consumed, there is no real death of a product, only its transformation from one birth to another.

Does this mean we can still design more market-friendly products that can go out of style, or be replaced sooner than is needed, if we ensure the material inputs and outputs are 'technical or biological nutrients'? That may be one implication of McDonough and Braungart's work. If Paul Smith Design had been designing LG's LV3000S handset motif with the cradle-to-cradle philosophy in mind, might it not have questioned why the handset cover wasn't made of plant-based starch or some other biodegradable, non-toxic material?

Many companies have already embraced their ideas. Shaw Carpets, have their very own 'Carpet to Carpet™' recycling process, which it claims prevents 300 million pounds of carpet going into landfill every year. In 2005, Fujitsu launched a laptop using a biobased resin – polylactide (PLA). Michael Braungart points to SteelCase office furniture: not only designed for disassembly and remanufacture, but also making use of materials suitable for sealed indoor environments where the air quality can be eight times worse than outdoors.

The embedded energy costs of such initiatives are not well researched and they may, in the end, be revealed to be similar to conventional products. Nevertheless, designing for remanufacture and reuse may prove to be attractive to big business because it can be more profitable than traditional methods. Photocopiers made by remanufacture pioneer Xerox can have up to seven lives, which means seven revenue streams – although, as the Centre for Sustainable Design points out, design for remanufacture and reassembly can require a fundamental redesign of supply lines and factories, which many businesses feel ill-equipped either to envision or implement. To date, remanufacture amounts to around one per cent of the UK's manufacturing output.

What is key to McDonough and Braungart's work, however, is that their ethos invites both designers and environmentalists to think of generative solutions to problems. The emphasis moves from focusing on how to reduce, minimise and decrease, to imagining a world where every product, building and service is designed to give something back to the environment and community.

**'Designing for reuse may prove to be attractive to big business. Photocopiers can have up to seven lives and seven revenue streams'**

**'The average power tool is used for 10 minutes in its life – but it takes hundreds of times its own weight to manufacture such an object'**

### Engage consumers to demand good design

'Securing the Future', the Government's Sustainable Development Strategy that promotes eco-design as a mainstream element of good design practice 'designed-in' at an early stage of the product cycle, notes that consumers don't always put their principles into practice, and consumption patterns are often limited by goods and services available.

John Thackara suggests designers should appeal to people's logic by designing for use, not for ownership, since many of us already lease, rather than purchase, a device as part of a service contract, whether cars, refrigerators, answering machines or photocopiers.

'Power tools are a good example,' he says. 'The average consumer power tool is used for 10 minutes in its entire life – but it takes hundreds of times its own weight to manufacture such an object. Why own one if I can get hold of one when I need it? A product-service system provides me with access to the products, tools, opportunities and capabilities I need to get the job done – namely, power tools for me to use, but not own.'

The bottom line is that if manufacturers retain ownership and therefore responsibility for goods, for maintaining them, it forces them to make goods that are built to last, or built to be re-purposed.

Instead of selling a chair, Michael Braungart says we need to sell 10,000 hours of sitting time; instead of shoes, two years of foot transportation; instead of carpets, floor packaging insurance for defined periods.

However, he adds that we won't engage consumers by calling it sustainable or eco-design. 'Sustainability is about the minimum, about guilt-management, and if you're spending your time apologising for being on the planet, that's not creative,' he says. 'The notion of sustainability is boring and bland; it's about good design, and design is not good when it's toxic or it stinks. There's no such thing as green design; it's either good or bad.'

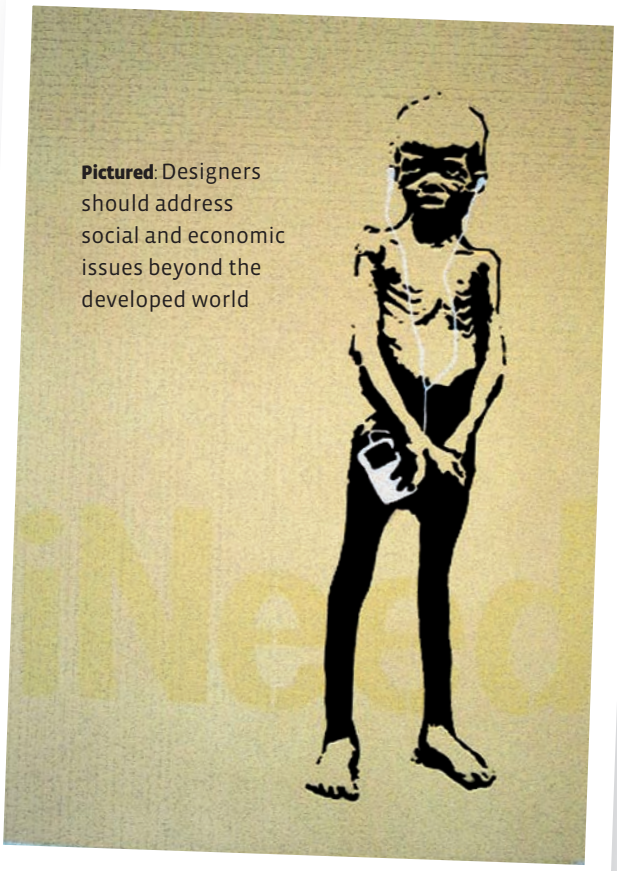
### An ethical design industry

Among many ideas to future-proof the health of the planet, improving the training and status of the design profession is also essential.

Tom Inns, professor of design at Dundee University agrees: 'There are exceptions, but most design education is focused on creating objects, not the services, systems and experiences associated with a dematerialised future. Our designers are still taught to visualise the tangible, not the intangible; they are taught to negotiate value, but usually only in financial terms. Understanding of other currencies (ethical and ecological values) for negotiating trade-offs during the design process is needed. They are taught little about collaborative design processes that will become increasingly important as the complexity of society's problems increase.'

The Design Council's Design Skills Blueprint, launched in spring 2008, aims to equip existing and future designers with the skills and professional resources they need to keep Britain at the forefront of sustainable design, but many also feel that design should be underpinned by a code of ethics in the same way other professions, such as the medical, legal and architectural professions, are.

Terry Irwin says a code of ethics would guide designers to design in resonance with life principles, not against them: 'We don't have a design process in which ethics is embedded, in which it becomes unthinkable to design in ways that cause harm to anyone, strictly for the sake of profit. Design process and theory should be underpinned by a deep understanding of things such as the carrying capacity of the Earth, the dynamics of ecosystems and self-organisation in living systems. If it were, a more ethical design process would emerge, one in which something such as planned



**Pictured**: Designers should address social and economic issues beyond the developed world

obsolescence would be seen as a pathology rather than a viable business strategy.'

What might such a code of ethics look like? Could it be as simple as 'First do no harm'? Or more comprehensive, along the lines of 'I will not only consider the utility of what I design to the consumer, but also what it can give back to the Earth and its community? I will recognise that just because I can envisage something, doesn't mean it's desirable. I will, wherever possible make it known, visible and clear the "cradle to cradle" costs of the products and systems I design....'

## Solving big problems

If the design industry did collectively have more awareness, what would it do? Move from tackling the isolated problem of how to continue fuelling the sophistry of style and the endless desire for the next new thing, and instead become architects of meaningful solutions? Applying their skills and methodologies to tackle problems on a much larger scale?

John Thackara cites food transportation as an example of how designers can solve big problems with large consequences. 'Twenty-five per cent of vehicle movements in most European countries are associated with people either shipping food or driving to get it,' he says. 'We can frame this big, complicated story as a design opportunity; into a series of individual design tasks people can do something about. For example, rather than complain about food miles, what practical steps can be taken to increase the growing of food in the city? If it's growing where the people are, you don't have trucks and airplanes going forward and backward.'

By applying so-called 'design thinking' —which, unlike critical thinking, provides a process for 'practical, creative resolution of problems or issues' — designers can help address strategic social and economic challenges, and not just for the developed world of monied consumers. When designers apply the same approach to the 90 per cent of the world population who don't have access to the products and services we take for granted, amazing things can happen.

Last year, in New York, the Cooper-Hewitt National Design Museum's exhibition 'Design for the Other 90 per cent' demonstrated how design can be a dynamic force in saving and transforming lives in the developing world — design innovations that support responsible, sustainable economic policy; help, rather than exploit, poorer economies; minimise environmental impact; increase social inclusion; improve healthcare at all levels and advance the quality and accessibility of education. The Kenya Ceramic Jiko, for example, a portable charcoal stove created by Rural Technology Enterprises, is designed to reduce fuel consumption by 30 to 50 per cent, saving the consumer money, reducing toxic emissions and resulting in better health for the user. The stove is now used in more than 50 per cent of all urban homes, 16 per cent of rural homes in Kenya and is spreading to neighbouring African countries.

## Passive choosers, responsible dreamers

We live in a world where change is something we are usually only willing to embrace when there is a crisis or fear of a crisis. Industrialists and environmentalists alike employ this rubric, and yet, as a motivator, fear sometimes fails to engage people, as it creates both cynicism and ennui.

If the environmental movement wants to avoid the 'post-environmentalist' debate being hijacked by neo-conservative interests then surely it must embrace the aspirational qualities of designers to provide people with a clear vision of what a sustainable world might look like. Otherwise, what are we saving the planet for?

'I dislike the way the environmental "debate" is too often limited by concepts of defeatism, negativism and even occasionally an embittered vengefulness,' says Stephen Bayley. 'My view of the future is not that we will have to retreat into huts made of dung and wear hemp leggings, but that new, more intelligent criteria about waste will stimulate ever-higher standards of cleaner, more responsible technology.'

Quite. Instead of trying to engage people by scaring the life out of them with a fear of what would happen if a tidal wave wiped out East Anglia, we might instead offer them a vision of how deeply satisfying it would be to live in a more sustainable society, one in which wellbeing wasn't measured by how recently you replaced your mobile phone.

As inherently pragmatic and optimistic beings, and guided by an ethical code, designers have the ability to do this.

John Wood thinks the ultimate role for designers would be to apply the idea of 'meta design' to help governments solve the lack of joined-up policy. 'Design works very differently from rule-based legislation and bureaucratic fiscal policy,' he says. 'Instead of defining and enforcing categories and boundaries, it delivers new benefits, opportunities and behaviours by inviting engagement at the experiential level... and (ultimately) changing the role of voters and consumers from being passive "choosers" to responsible "dreamers"'.

Anyone for a political 'design party'? No policies, no personalities, just a distinct methodology to determine the best solutions. It may yet come to pass.

**Nick Kettles is a freelance writer and consultant to small businesses seeking to better express their unique contribution to world peace and sustainability. Additional research by Terry Irwin**

### Further information

- Centre for Sustainable design **www.cfsd.org.uk**
- Attainable Utopias **http://attainable-utopias.org**
- Designs of the time 2007 (dott 07) **www.dott07.com**
- William McDonnough/Hannover Principles **www.mcdonough.com**


available from all good grocery and health food stores

www.rocksorganic.com

# GREEN PAGES

**LOOKING COOL, KEEPING WARM**
Beachwear for summer weather of all varieties

**ORGANIC BEER HOPS TO IT**
Why British brewers are having a happy hour

**WANT A FLAKE WITH THAT?**
Ice cream the way it's supposed to be made

Photography: KEN DICKINSON

MEET GREG STEVENSON

# Thatch the spirit of cottage renovation

**PLUS**

**GREEN FESTIVALS** What's on and what to take to this year's outdoor events
**BUZZ OFF** Keep insects at bay the natural way with these eco repellants
**THE PAPER DILEMMA** Tackling rampant consumption – one woman's quest

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# Contents




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Wherever you see this little bird it'll point you to relevant contacts in our Green Shopping Guide

A friend of mine recently announced that instead of going on her annual rave up to Ibiza she wants to go gypsy caravanning around the West Country. She's fed up with airports and flying, and would rather take it slow and stay closer to home. I'm tempted to join her.

On a sunny day, a holiday in the UK is hard to beat and there's nowhere I'd rather be. Admittedly, the weather can be unpredicatable. One of my earliest memories is sitting on a stormy Devon beach in August, wearing an anorak and eating a sand-infused salami sandwich. The wind was so strong it ripped the head off my kite.

Since then I've experienced everything from heatwaves in Inverness and West Wales to cold, damp camping trips in Cornwall, where most of the time was spent warming up in the pub. But I'm no longer daunted by the weather. I just pack for all eventualities.

In this issue we celebrate the great British holiday – from the quirky and green places to stay to what wear on the beaches, from ethically made anoraks to eco bikinis. Fergus Drennan explains why we should become a nation of seaweed-eaters, Rachel Clode samples the best British beer and picks the top green festivals and fairs and I discover why traditionally made organic ice cream tastes better than anything you'd find in Mr Whippy. Enjoy the summer.

Laura

**Laura Sevier, Acting Green Pages Editor**

**email:** greenpages@theecologist.org

# July/Aug

BY RACHEL CLODE

## Don't walk away

Get your local community to join the Walkers Are Welcome network. Follow its six steps and your area could enjoy a reputation as a great place for people to visit on foot. **www.walkersarewelcome.org.uk**

## Fruit of the Month

### Blackcurrant

This month toast the British blackcurrant. The small but mighty superfruit *Ribes nigrum* becomes ripe from early July until mid-late August in the UK. With its distinctive sharp flavour, it is packed with anthocyanins and vitamin C – meaning your cordial, jam or tart will also be helping to keep your heart, brain, urinary tract and vision healthy. As if that weren't enough, blackcurrant bushes need to be well established and can grow on one small piece of land for up to 15 years without crop rotation, providing a long-term habitat for wildlife. See **www.blackcurrantfoundation.co.uk** for more details.

## Websites of the month

- **Search and donate** Check out the Veosearch search engine, which raises money for charities through advertising revenue **www.veosearch.com**
- **Breaking the chain** A guide to the best independent shops in London **www.unchainedguide.com**
- **Map the world** Protect your planet by becoming a land guardian **www.healthyplanet.org**

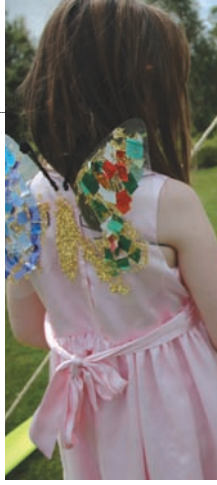
# Festivals

**Whether summer is here or not, it won't stop the festival season. Camp out with friends and family, or take a day trip and enjoy great music, arts, food and debate at some of the best in UK green and sustainable festivals and shows.**

### 17-20 July
### Latitude

**Henham Park, Suffolk**

Music, dance and arts from the Lake Stage, visit the world's first fuel-cell theatre or win a tree dedication. See **www.latitudefestival.co.uk** for tickets.



### 11-13 July
### Kent County Show

**Maidstone, Kent**

Learn about sustainable building, conservation, energy and lifestyle in the Ecovillage, as well as tracing your food to your fork in the 'Why farming matters' zone. For tickets, see **www.kentshowground.co.uk**

## Survival of the greenest

*Green festival-goers' top tips...*

**A footprint as light as a leaf**

Indian Areca palm leaves, heated then pressed into shape, make for completely biodegradable tableware. The Wholeleaf Co. says that 300,000 marginalised people in rural India would be able to support themselves if the world's paper and plastic 'disposable' plates were replaced. See **www.thewholeleafco.com**

**Naturally rid of nibblers**

Dancing outside is great until the midges and mosquitoes join you, but there are natural alternatives to the normally toxic and unpleasant smelling anti-bite solutions. NeemCo Insect Repellent is made from the neem tree, known as the 'village pharmacy' for its healing properties – and not even locusts will go near it. See **www.neemco.co.uk** for details.Using ingredients from natural Asian remedies, Incognito Mosquito Protection blocks insects from sensing your kairomones, chemicals produced by living organisms which mosquitos can sense from a kilometre away. See **www.lessmosquito.com**

**Big up your bags**

Lessen festival waste by making your own bags. Morsbags was set up to tackle the problem of the 'urban jellyfish' – the non-biodegradable carrier bag – and now supports, educates, sews (a lot) and distributes thousands of handmade bags free to shoppers. To join the revolution or to make your own morsbag, see **www.morsbags.com**

**Above**: Using FSC-sourced organic citronella, Incognito repels mosquitoes, horseflies, sandflies, ticks and fleas

## 26-27 July
## The Fairyland Trust's Fairy Fair

**Narborough Hall, near Swaffham, West Norfolk**

Conservation charity the Fairyland Trust returns with family-focused workshops using myth, legend, folklore and magical traditions to introduce children to ecology and natural history. See **www.fairylandtrust.org** for tickets.

## 8-10 August
## Earthwise 888

**Uffington Horse, Berkshire Downs, Oxfordshire**

Actively participate in the workshops, forums and presentations on green and sustainable living. Earthwise welcomes families. See **www.earthwiseevents.co.uk**

## 15-17 August
## Green Man

**Glanusk Park, Brecon Beacons, Wales**

Folk music and local pop heroes are on the bill amid Celtic stones and set against the backdrop of Sugar Loaf Mountain. Visit the solar-powered milk float stage, have some holistic therapies and warm up at the communal bonfires. **www.thegreenmanfestival.co.uk**

Photography: SHOT2BITS.NET

## 7-9 August
## Moor Music Festival

**Ilkley, West Yorkshire**

Take a break from the bands to see art and films, relax and play a game of chess in the 1920s-style tearooms, or head towards the campaigns stands. For tickets, see **www.moormusicfestival.co.uk**

## Sail away

Crew 'Eda', a 75ft restored traditional 1930s Danish lobster-catcher in Mallaig, Scotland. Sailing and visiting the Western Isles for seven days, you will be introduced to the skills of sailing while learning about Hebridean culture and ecology. Open Ground, experts in ecology, community projects and environmental leadership, will tailor the trip to fit the needs of the group and ask only that you bring with you your enthusiasm. See **www.openground.eu** for information on Open Ground's September voyage.

## Pick of the month
## Pixley Berries

Made from 'Pixley Black' blackcurrants in Herefordshire, Pixley has four varieties of cordial, which are 60 per cent juice with no additives or colourants. This means the flavour is rich enough to use as a mixer in alcoholic drinks and as a pour-over accompaniment to summer puds. See **www.pixleyberries.co.uk** for stockists.


Email: rachel@theecologist.org with upcoming events for In Season

# Food in season

**Fruit**

Apple
Blackberries
Blackcurrant
Redcurrant
Cherry
Cobnut
Elderflower
Pear
Plum
Rhubarb
Tomato

**Vegetables**

Artichoke (globe)
Aubergine
Bean
Beetroot
Broccoli (calabrese)
Cabbage
Carrot
Cauliflower
Chard
Courgette
Cucumber
Dandelion
Endive
Fennel
Garlic
Kohlrabi
Leek
Lettuce
Onion
Pea
Potato
Pumpkin
Radish
Rocket, wild
Samphire
Shallot
Sorrel
Spring onion
Squash and pumpkin
Sweetcorn
Turnip
Watercress
Wild mushroom

**Above**: Cherries contain potent antioxidants – anthocyanins – which give the give the fruit its red colour

**Below**: Lettuce can be grown in window boxes

# Environmentally Driven
# Ethically Sourced

## Packaging & Products

- Ethical and sustainable product sourcing
- Recyclable packaging - no composite materials
- Natural food with no artificial additives or preservatives

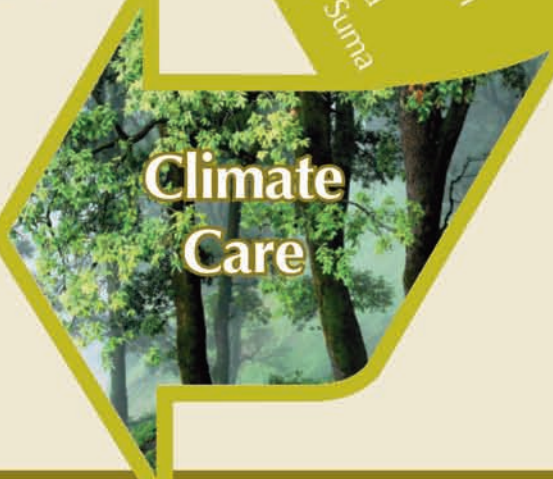
## Health & Body

- 100% natural body care and household products
- No Sulphates, Benzoates or Azo-colourings
- Extensive range of hypoallergenic products

## Suma

**For those who think beyond their plate**
**For those who look for the story behind their shopping**

## Climate Care



- Carbon offsetting through the planting of 1000s of native trees
- All our electricity comes from a sustainable source
- Old PCs donated to Africa with training provided by Suma

We supply a range of over 6,000 products to customers throughout the UK - if you are interested in ordering from us, call a member of our New Business team on **01422 313861** or send us an email to **newbusiness@suma.coop**

New customers who order before 31st August will receive a bulk pack of recycled toilet paper (worth over £10).
Please quote 'Eco-paper Offer' when placing your order.


LOCAL HERO

# Greg Stevenson of Under The Thatch

Derelict cottages restored to former glory, happy holidaymakers and revived communities – all the result of one man's vision. **Richard Hammond** reports

The home page of Greg Stevenson's holiday letting website, underthethatch.co.uk, shows an intriguing collection of self-catering properties: a converted train carriage, a Scandinavian-style log cabin, a gypsy caravan and several charming-looking thatched cottages. Most are relatively inexpensive, and they all seem to be in beautiful settings in the Welsh countryside. Yet whenever I've tried to book one for a weekend, his properties have always already been taken, months beforehand. Then late last summer, lady luck struck: the gypsy caravan in south-west Wales – Greg's most popular let – had a cancellation. So before someone else snapped up the opportunity, I hired a car with a friend and drove the six hours from London to the village of Rhydlewis, Ceredigion, to spend the weekend 'Under the Thatch'.

**Pictured**: Greg Stevenson in the Aberporth Express, a converted railway carriage near the sandy beaches of Aberporth and Tresaith

Photography: KEN DICKINSON

The gypsy caravan is certainly in a picturesque setting, just as the website promises. Tucked in front of a clump of aspen and poplar trees, the bright green caravan, ornately painted, stands in an acre of wildflower meadow beside the river Ceri, in a Site of Special Scientific Interest designed to protect the resident brown trout and otters. It's the smallest accommodation I've ever seen, but as snug as they come. Up a few steps behind the caravan there's a wooden cabin with all the essentials for self-catering, including a kitchenette, shower room and toilet, as well as a covered veranda with a table and a basket of fuel for a wood burner. Neither the caravan nor the cabin has thatched roofs, however.

'Under the Thatch isn't at all what it seems,' Greg explains. 'What customers see is a holiday cottage agency, but behind that – and the reason the company exists – is what we do to conserve historic buildings at risk. In some ways we're like a smaller version of the Landmark Trust, only we're working as a private business on a different scale. All of the profits from Under the Thatch go back into funding the building conservation work.'

Greg's passion is renovating derelict cottages, mainly thatched cottages, though he also works on tin-roofed buildings. He began the business in 2001 by renovating a dilapidated part of his own house using earth and thatch – in the traditional way – which he then rented out as a holiday let. He thought it would be a good idea to let somewhere that was much

more rustic, authentic and affordable than anything else on the market, and soon saw the potential.

'It was full from day one, so we soon realised there was a huge demand for a historically interesting house,' Greg says. 'People were fascinated; they wanted to know more about the building, so it was paying for itself.'

**Building success**

At that time there were a lot of derelict buildings going for low prices in south-west Wales, so Greg began buying up several other old buildings and renovating them with thatch and tin. In 2003, he bought his second, Troed-Rhiw-Fallen – a derelict cottage that had been on the market for 15 years.

'The next-cheapest house in the village was a small terraced cottage that cost about £60,000. The cottage I wanted was a quarter of the price, yet no-one wanted to touch it. It was structurally unsound, but it was the most historically important building in the village, the oldest that had survived, the only one that really reflected the local tradition.'

Greg bought the derelict cottage for £15,000 and renovated it with support from Cadw (the Government heritage body in Wales). A small grant from the Welsh Tourist Board enabled him to build an extension in a corrugated Victorian style.

Greg's renovations typically use only traditional materials. He uses lime instead of cement (his cottages are characteristically white lime-washed with yellow ochre); nor does he use modern gypsum plasters. Paints are natural oil-based, rather than modern synthetic, and, of course, he uses local thatched materials. Though his style of renovation is essentially environmentally friendly, Greg admits his green credentials came about by chance: 'It hadn't occurred to me before but the traditional methods also happen to be the most sustainable.'

Greg's reputation as a restorer of derelict cottages grew, and he soon began consulting on other people's properties, some of which he agreed to let as part of his Under the Thatch business, in addition to his thatched cottages. One of his most famous commissions was from actor and presenter Griff Rhys Jones, who asked Greg to renovate his cottage Trehilyn Uchaf, near the Strumble Head peninsula in Pembrokeshire, which became the subject of the BBC4 TV series *A Pembrokeshire Farm*. It is one of Greg's most environmentally friendly conversions and is now let through Under the Thatch whenever Rhys Jones is not there. Heated by a wood-pellet central heating system (so no oil used), the cottage is insulated with Welsh sheep's wool – rather than fibreglass – much of the wood has come from local sustainably managed woodland and the roof and floor slabs are from materials local to Wales.

As a result of the boom in the

**Opposite**: The Romany caravan in West Wales stands in a wildflower meadow beside the river Ceri
**Right**: Troed-Rhiw-Fallen, one of the best preserved traditional Welsh thatch cottages
**Below left**: The bedroom of Troed-Rhiw-Fallen

> People were fascinated; they wanted to know more about the building, so it was paying for itself

West Wales housing market, by 2005 the prohibitively high prices of old cottages, and a general shortage of traditional cottages surviving in original form, meant Greg began to diversify and look at other projects. He renovated the traditional Romany caravan and purchased a Scandinavian-style holiday cabin, which he restored with a period 1970s interior. Since then he has taken on a converted railway carriage, more cabins, a 1940s Showman's Wagon and a second gypsy caravan in the Black Mountains. The idea is that all the properties on his books are 'architecturally significant, unusual or interesting, and a great place to spend a holiday'.

Greg now manages bookings for more than 30 properties in south-west Wales (just seven are thatched) and has plans to expand the business further. He has recently opened a 'vegetarian cottage' – Llwyn-Dryssi, near Llanllwni Mountain in West Wales. Guests are politely asked not to bring meat (or poultry/fish) – 'to provide a genuinely meat-free environment for dedicated vegetarians'. Greg also plans to open an off-grid barn conversion and more renovated thatched cottages.

Most, though not all of his properties, are run using environmentally friendly technologies: some have solar panels, others have reed-bed sewage systems, wood-chip boilers and recycled furnishings. Greg also provides guests with the opportunity to pre-order a food

## Green holidays in the UK

- **Ecocabin, Shropshire:**
A wooden lodge in the Shropshire Hills built out of wood, wool, reeds, lime and clay. There is solar power and a wood-pellet stove to heat the living room, you can order a delivery of local organic food and hire bikes can be delivered by **www.wheelywonderfulcycling.co.uk**. See **www.ecocabin.co.uk** or call 01547 530183. Take the train to Craven Arms, from where you can arrange to be collected by the owner.
- **Langdon Beck, North Pennines**
The YHA's greenest hostel. A wind turbine and photo-voltaic panels generate more than 60 per cent of the 31-bed hostel's power, and solar thermals heat the water. Sheep's wool and recycled newspapers provide the insulation, and rainwater is harvested from the roof. See **www.yha.org.uk** or call 01629 592708. Take the train to Darlington, Arriva 75/76 bus to Middleton-in Teesdale then Upper Teesdale bus link 73.
- **Southwaite Green, Cumbria**
Four eco-cottages near Cockermouth in the Lake District. The rooms have been laid with slate and oak floors, with an underfloor heating system drawing on ground heat. The sheets and towels are made from organic cotton and many of the furnishings are made by local craftsmen using sustainable timber. See **www.cumbrian-cottages.co.uk** or call 01228 599960. Ten per cent of profits go to supporting sustainable development projects in developing countries. Take the train from London to Penrith then the X4/X5 bus service to Cockermouth, from where the owner can collect, by arrangement.
- **Strattons, Swaffham, Norfolk**
A wonderfully colourful boutique hotel that proves that being green doesn't mean you have to compromise on style. According to the owner, only two per cent of the hotel's waste goes to landfill; the rest is recycled or reused. The restaurant has also won several food awards – all is local, seasonal and organic (where possible). There's also a 10 per cent discount if you arrive by public transport. See **www.strattonshotel.com** or call 01760 723845. Take the train to King's Lynn then the local X-1 bus from Peterborough, which stops right outside the door.

hamper from a local producer (welcome-box.co.uk) – 95 per cent of the owner's business now comes from Under the Thatch guests, Greg says. He is also keen to encourage guests to come by public transport; some are within walking distance of train stations, and Greg offers a collection service for several properties. Yet he is cautious about over-hyping his environmental credentials.

'We call ourselves a sustainable business, and although we are probably more environmentally conscious than most, the real reason we're sustainable is in a social way.'

Unlike most holiday homes, Greg's properties are let all year round, and where he judges any may not be occupied he drops their price until they are. He'd rather properties were used by visitors paying just above cost price than not being used at all. And with that comes a bargain or two: it's not unusual for Greg to rent out a property for as little as £35 a night.

It's a policy that Greg introduced to counter the second-home culture.

'The average occupancy in Wales for self-catering cottages is around 35 per cent, which is shocking considering this means these places are basically empty for most of the year. Some of the prices being charged are shocking too. It's those high prices forcing people on to cheap flights and cheap package tours abroad, which is causing huge environmental damage.

'Sadly, in Pembrokeshire there are villages whereby nobody lives – they're ghost villages. Every single house is a second home or holiday cottage which is empty, and that's why all the local facilities close in the winter.'

Greg's enlightened flexible pricing scheme is certainly working – occupancy across the board is more than 90 per cent – and consequently, Greg says, his properties 'contribute to the local economy rather than to its decline'. Though his business grew initially by word of mouth throughout south-west Wales, its reputation has now spread far and wide. Under the Thatch has won a Wales Sustainability Award and last year won the *Guardian* and *Observer*'s Ethical Travel Award.

Back at the gypsy caravan it is obvious self-catering guests can bring genuine benefits to the local economy – as long as they shop locally. The village of Rhydlewis benefits not only from guests staying at the caravan, but also at Ty'r Gôf (The Blacksmith's Cottage) – a small thatched cottage for two that Greg has also brought back into the community. Guests can buy smoked salmon, trout, mackerel, bacon and local cheeses from a small traditional smokery, while the Rhydlewis village shop is a 10-minute walk away. On our final afternoon, we visited a local pub by Llangrannog Bay, a short drive away, and in the evening ate dinner outside the cabin in a cocoon of comfort, a world from anywhere, listening to the sounds of the river and the forest. I wasn't surprised to be told subsequently by Greg that the caravan is occupied by guests every day of the year. Lucky them, and lucky Rhydlewis.


**Pictured**: Greg reclines on the sofa at Ffynnon-Oer Isaf, the first cottage he restored in 2001

See **www.underthethatch.co.uk** for more information and reservations

**Richard Hammond is the editor of *Green Places to Stay* (Alastair Sawday Publishing) and runs www.greentraveller.co.uk.**

## Useful websites

- **www.ecoescape.org** A directory of green places to stay and visit in the UK.
- **www.naturaldiscovery.co.uk** A website that promotes a range of places to stay in the UK that are committed to environmental improvement.
- **www.green-business.co.uk** The website of the Green Tourism Business Scheme, the UK's leading certification scheme, which rates tourism-related businesses, such as hotels, travel companies and conference venues, on their green credentials.
- **www.blueflag.org** The website of the Blue Flag eco-label, which identifies environmentally sound beaches and marinas. There are 144 Blue Flag-certified beaches in the UK.
- **www.sustrans.org.uk** The UK's leading sustainable transport charity co-ordinates the National Cycle Network, which provides more than 8,000 miles of signed cycle routes in the UK.
- **www.greentraveller.co.uk** 'The first place to look for green holidays and for discussions on environmental issues.' *The Sunday Times, 2007.*

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# Kelp is at hand

Seaweed is delicious, nutritious, a veritable cure-all and just one of the reasons **Fergus Drennan** does like to be beside the Great British seaside

In July 2006, with smoking hot oil-filled wok in hand, I carried out an undercover survey disguised in medieval attire. I was offering free deep-fried seaweed to the curious hoards attending a kentish medieval fayre, and a young lad from the Shires who was trying seaweed for the first time exclaimed sincerely, spontaneously and without prompting, 'Wow! This tastes better than chocolate!'

On that day, 39 children tried seaweed and 39 gave it the thumbs up. A year later, this time disguised in a burdock leaf suit (pictured, above left), I carried out a similar survey in Camberwell, London. Again, the statistics spoke of seaweed's supreme delectability: 11 out of 11 children liked it. Of the 208 people who tried seaweed samples on both occasions, only one person disliked it. From this small survey it can be concluded that 99 per cent of adults like seaweed, 100 per cent of children like it and one in 50 thinks it tastes better than chocolate.

Aren't statistics wonderful? Here are some more. Two of the greatest seaweed-loving cultures on Earth, Japan and China, have coastlines of 18,486 miles and 11,160 miles respectively. And yet with a UK coastline 11,072 miles long, and blessed with one of the richest areas for seaweed in Europe, we have never really developed as a seaweed eating culture, despite the fact that Wales excels in the art of the laverbread, Ireland knows how to knock up a mean carragheen dessert and the Scots are partial to a wee bit of dulse.

## What exactly is seaweed?

Seaweeds are mostly marine but can also be brackish water algae, ranging in size from the microscopic up to 50m in length – the largest in Britain being *Laminaria hyperborea*, a 2m-long member of the kelp family. They are categorised according to colour: red, green and brown. Although they photosynthesise in the same way as plants, the similarity ends there. Rather than from soil, they draw all their nutrients from the surrounding water and have holdfasts, stipes, lamina, fronds or blades as counterpart to the more familiar roots, stem and leaves of land plants. In fact, it is their ability directly to absorb and concentrate nutrients and other substances in this way that makes seaweeds both incredibly beneficial for human health and a possible source of toxicity. The latter is a real problem if inadvertently and regularly eating seaweeds gathered growing in areas of heavy industry – including nuclear facilities.

## Collecting and storing seaweed

For sheer variety rocky coastlines are best, but as long as there are a few exposed rocks, your chances of finding a good variety increases dramatically. Ideally, collect only the freshest seaweeds: ones firmly attached to a rock. Seaweeds with a stipe should be cut a few centimetres from the frond base to allow for regeneration. It's important to time your visit to the coast to coincide with the new and full moon. Different seaweeds grow at different tidal zones across the beach and at this time the tides are very low on most shores, thus revealing the full variety of seaweeds in your location. Tide tables can be purchased from fishing tackle shops (for the year) or found online. See www.bbc.co.uk/weather/coast/tides

Most seaweeds are at their nutritional height when gathered in June and July, and the opportunity for solar drying is not to be missed. While others are sunbathing, lay out a

Illustration: LUCY SELINA HALL


blanket and cover with a single layer of seawater-rinsed seaweed. Turning over once, most seaweeds can be dried in two days of full sun. Stored in air-tight containers it will last up to a year; dried to brittle in a low oven it will last far longer. Simply rinsed in the sea it will keep in the fridge for a week. The Japanese often pack fresh seaweed in salt before refrigerating, which will make it last for months – just rinse it before use. All seaweeds are edible except *Desmarestia*, *Asparagopsis* and *Bonnemaisonia* varieties, which contain unpleasant compounds. Familiarise yourself with these and it's plain sailing from then on.

### Cooking with seaweed

Seaweeds can be eaten raw – for instance as a kraut or dressed with vinaigrette – or cooked: deep-fried, shallow-fried, boiled, steamed or smoked. One of my favourite ways is to deep-fry them down on the beach. All seaweed can be cooked in three to 15 seconds in this way and tastes fantastic. Your oil needs to be smoking hot and the wok not overloaded; add a handful of seaweed at a time after squeezing out as much water as possible.

There is a marked difference in flavour between the various colours (red, green and brown) but also within families: bladder wrack, serrated wrack, egg wrack and channelled wrack have flavours uniquely their own. My other favourite method is to use sheets of green sea lettuce or brown laver to wrap wild fennel-stuffed fish fillets and cook on hot embers in a buried sand or shingle oven.

If you're not the foraging type, see our list of fruit and vegetables in season **p 57** and shopping guide **p 84**

### Seaweed for health

Seaweed baths are wonderfully therapeutic due to their high mineral content, while there is something deeply sensual about bathing with your partner when she suddenly turns alluring mermaid! Such therapeutic visions offer a wonderful distraction from the other painful conditions that seaweeds can help alleviate, such as rheumatism and arthritis. Consumed regularly, seaweed can also help improve poor thyroid function (consult a doctor if on medication for this), improve circulation, relieve allergies, restore vitality and generally cleanse and detoxify the body. Its high concentrations of zinc and vitamins A, B, C and E make it a potent remedy for poor skin conditions. I personally became convinced as to the genuine health benefits of seaweed during my first attempt to eat nothing but foraged foods back in 1995. At the time I was cycling around Ireland for three months. Seaweeds were my daily staple and sped me along at 70 miles a day with energy and enthusiasm. More than 10 years later it's the seaweed baths that appeal to my aching limbs! And last July on a high-seaweed 100 per cent wild food diet I managed to halve my bad cholesterol in a month.

Finally, let's not forget that soil loves seaweed. As mulch or in a compost heap it's a veritable miracle grow!



## In season

**Seaweeds**

Sea lettuce
Laver
Carragheen
Dulse
Beanweed
Maiden's hair
Dabberlocks
Gutweed – *Enteromorpha genera*
Kelps – *Laminaria genera*
Wracks - *Fucus genera*

**Land plants**

Parasol mushrooms
Giant puffballs
Fairy ring mushrooms
Wild cherries
Blackberries
Mulberries
Cherry plums
Bulrush pollen
Marsh samphire

**Above:** Seaweed is a good souce of zinc and vitamins A, B, C and E
**Right:** Pick your blackberries now to make into jam

## Reading

*Seaweed: A User's Guide* by Sonia Surey-Gent and Gordon Morris

## On the web

**British Phycological Society**
www.brphycsoc.org
**Seaplant Handbook**
www.surialink.com/handbook/index.asp

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# To your health!

The UK's organic brewers are calling time on beer corporations, as **Rachel Clode** discovers

Picture a summer's day, the horizon undulating in the haze of the heat as you raise a pint of refreshing pesticides to your lips. Cheers. Yes, pesticides. In a bottle, in a glass. That's beer – or at least that's probably part of your beer if you are drinking many of the commercial, mass-produced liquids born of chemical agribusiness.

Beer, lager and ale are made by extracting sugars from barley malt and other cereals. The sweet liquid this produces is then fermented with yeast, which converts the sugars into alcohol. A 2002 report published by the British Beer and Pubs Association and Brewing Research International, showed 23 organofluorine pesticides approved for use on malting barley in the UK. One of these is the fungicide quinoxyfen, which, when tested in the 1990s in varied dosages on beagles, mice, rats and rabbits produced, among other side effects, increased cholesterol, kidney and liver weights, loss of appetite and anaemia. The Pesticides Safety Directorate's 2004 report into pesticide residues in beer found traces of 30 different pesticides across 45 samples.

**Above left**: Atlantic is made from home-grown organic hops
**Above right**: Bottles from Scotland's Black Isle Brewery are made from recycled glass
**Opposite**: The Stroud Brewery uses local history when it comes to naming and branding its beers

Aside from the potential of swigging a chemical or two, mass-produced beer just doesn't taste as good as the traditional and organic beers now being brewed in the UK. Less than a decade ago, however, the independent brewing industry in the UK was seriously under threat from mass-producing beer giants. In 1998, four brewers dominated the market, with an 83 per cent share between them, but since the introduction in 2002 of the Progressive Beer Duty, which brought about tax relief for small breweries, microbrewing is now expanding, with independent and organic brewers across the UK at the forefront of the British beer revolution. The Chancellor of the Exchequer, Alistair Darling, has already increased the price of a pint by 4p, taking the tax for a pint to 73p. With his pledge to raise alcohol duty by two per cent above inflation for the next four years, demands for the highest quality and best taste are firmly in the hands of discerning punters and they are not going to compromise – though few realise just what goes into that pint or bottle.

## Cracking good organic malt

The finest barley is low in nitrogen; too much produces a hazy effect. Organic farming lessens nitrogen, producing a higher-quality malt than agribusiness malts. Barley begins transition to malt in maltings, where grain is washed or 'steeped' in tanks with water for around 60 hours. The wet grain is then raked over four or five days and begins to germinate. The grain cannot fully germinate or it will begin to

consume its own sugars. The brewer checks that the malt is soft by tasting it. Heating the malt for 48 hours stops the germination process. The paler the malt, the higher the enzymes; the darker malts, such as chocolate, used for stout, are heated at higher temperatures.

The malt is cracked in a mill, mixed with water in a mash tun then the recipe is refined by adding darker malts, according to the type of beer. After standing in the tun, where the starch converts to sugar, the brew is sampled, before hot water is added to kill the enzymes. The wort, a sugary liquid it produces, is run off and the grain sprayed with water. The wort is then boiled and hops added at the start, halfway through and close to the end of the process, after boiling for an hour or more. The caramelised malt sugars provide the beer's colour and body. After cooling, yeast is added to the hopped wort, fermenting until most of the sugar has turned to alcohol and carbon dioxide. Fermentation takes around seven days, when the beer is then left to stand for a few days before running into bottles or kegs.

## Small and mighty UK hops

Hops are particularly prone to fungal infection, exacerbated by the UK climate, making them a high-risk crop.

'There are very few organic hops producers in the UK and most of the crops are pre-purchased through large organisations,' says Greg Pilley, head brewer at the independent Stroud Brewery.

Most organic hops come from New Zealand or Germany, though the price drove Stuart Thomson, of Atlantic Brewery, to grow his own. 'Organic hops were 100 per cent more expensive, so I got two dwarf varieties – fuggles and first gold – from the National Hop Association and propagated them myself,' he says. Already an organic farmer, Stuart is the only UK brewer to grow his own organic hops.

Development of other hops – such as the aptly named dwarf variety 'Boadicea', cited as the first in the world to incorporate strong natural resistance to the hop aphid – could result in the use of far less pesticides, lowering the cost of farming hops and bringing this crop back to the UK.

## Parched? Grab an organic and independent UK bottle or pint here...

- **Atlantic Brewery, Cornwall** Atlantic Gold with ginger gives an enlivened aftertaste. If you like your beer stronger, try Fistral Premium. Stout drinkers should try Atlantic Blue, made with chocolate and coffee malts. See **www.atlanticbrewery.com** for stockists.
- **Black Isle Brewery, Scotland** From regional Heather Honey to the continental style Blonde, all in recycled glass. Order online at **www.blackislebrewery.com**
- **The Organic Brewhouse, Cornwall** Mainly cask ales – find pubs and shops at **www.theorganicbrewhouse.com**
- **Stroud Brewery, Gloucestershire** Try its Organic brew, naturally conditioned amber bitter Tom Long, named after a mythical highwayman in the Cotswolds, or pale ale Budding, named after Edwin Beard Budding, inventor of the lawnmower. See **www.stroudbrewery.co.uk** for pubs, or order online for parties.
- **The Swan, Inkpen, Berkshire** 17th-century organic inn, restaurant and shop selling Butts organic beers 'Traditional' and 'Jester', with one or two others from the Butts range. Bottled organic beer is sold in the shop. See **www.theswaninn-organics.co.uk**
- **The Inspiral Lounge, Camden, London** A modern ethical bar with its own jetty by the lockside of Regent's canal, the ideal place to try the bottled organic Atlantic range or Freedom on draft. See **www.inspiralled.net**
- **The Duke of Cambridge, Islington, London** Organic everything at this renowned pub, which had the first London organic ale made especially for it. They now serve Pitfield, St Peter's and Freedom on draft, plus a wide range of bottles to drink in a sustainable refurbished conservatory. See **www.sloeberry.co.uk/duke.html**

**Find out more about beer in the UK:**

- The Campaign for Real Ale (CAMRA) **www.camra.org.uk**
- The Soil Association **www.soilassociation.org**
- The British Beer and Pub Association (BBPA) **www.beerandpub.com**
- *The Organic Beer Guide* by Roger Protz


## Reconnecting communities

Brewing beer is a traditional skill in the UK and one that reconnects communities, especially in rural areas. In Cornwall, The Organic Brewhouse has revived the local brewing tradition. Andy Hamer mainly brews cask ales – bespoke named beers for Cornish pubs and guest beers for pubs around the UK – as well as bottled beer. Using bore hole water for his brew, Andy believes keeping ingredients simple and sourcing high-quality organic raw materials are the only two things needed to make great organic beer.

Other microbrewers have followed, such as Atlantic Brewery, whose organic bottled beers are made from spring water on the Treisaac farm near Newquay, in Cornwall. Stuart Thomson made organic beers and wines before buying a microbrewery, and now supplies organic beer to local restaurants such as Jamie Oliver's '15' and to bars and pubs around the UK. Independent Stroud Brewery uses local history in the naming of its naturally conditioned and organic brews; the labelling tells stories of mythical highwaymen and reflects the Cotswolds trade history – all of which encourages engagement with the source of the beer and the region, as well as the flavour.

Beer, if it isn't consumed to excess, is good for you. It's packed with vitamin B6 and a glass or two in good company puts a smile on your face – knowing your drink is natural and organically produced should keep it there. Back to that summer's day, leave out the pesticides and say cheers.

# On the crest of a green wave

A cleaner, greener, more ethical approach to outdoor gear, Finisterre swept into UK shops on a surfing brainwave. **Laura Sevier** meets the team behind the eco-active clothing company

Surfer Tom Kay is grappling with a dilemma.

'A lot of people are in the sea the whole year round – even in February mid-week – but the gear they're putting on out of the water is expensive, non-durable and not ethically made,' he says. Which is why, in 2002, he set up Cornish surf clothing company Finisterre. Whereas many of the well-known surf-inspired clothing brands follow the high street business model, Finisterre is more in tune with the Patagonia and Howies model – top-quality products with the lowest environmental impact.

Finisterre's line of waterproofs, jackets, hoodies and sweatshirts is not made in China but by nuns in Colombia as part of a 15-year-old social regeneration program, or in Portugal in a facility 'that has the top ISO accreditations'. And, if all goes to plan, the company will soon start manufacturing some of its line in the UK. At the core of the brand is a sustainable design philosophy that means they ask themselves questions at every stage of the process – questions such as 'Does the red dye use more heavy metals than the pink dye?' or 'Is this fibre easy to recycle?'

At first, Finisterre was a one-man project, run from a laptop in Tom's attic bedroom in St Agnes, Cornwall. To stay afloat, he taught surfing and did shifts as a lifeguard. Now they are a team of four, the company has been going for six years and has a line of six products. Finisterre clothing has been worn by the Special Forces and the British Mountain Rescue Teams in some of the world's harshest conditions. Most impressively, designer Tom Podkolinski says every stage of those products' life cycle is accounted for: 'Transparency is the key. The company is small so I'm involved in sourcing and developing fabrics, designing garments all through the chain. It's so important to understand the implications of your actions as a designer.'

## Biomimetic fashion

Making eco-clothing for cold-water surfers and other outdoor enthusiasts braving the elements is more complex than organic cotton t-shirts. Jackets, for instance, need to be warm and in some cases waterproof and windproof; they need to be breathable, durable and made to last. Finisterre currently has 20 different textile development projects on the go, focusing on natural and man-made fibres. Biomimicry (imitating or copying features of plant or animal design) is an important part of its current development. 'There

**Above**: The Finisterre Etobicoke jacket uses recycled polyester
**Left**: Lofted merino hooded sweatshirt
**Opposite top**: jacket weatherproofed with beeswax
**Opposite bottom**: biomimetic waterproofs

is a huge amount of value to be gained environmentally and in performance terms,' says Podkolinski. This season Finisterre has developed 'biomimetic' waterproof jackets that use a fabric system inspired by animal fur.

'It's the first step in a long-term plan that's allowed us to move away from the solvents, lamination techniques and heat-sealing so common in the outdoors market,' explains Kay, 'and they're warmer, drier, tougher and more comfortable.' The outer 'shell' is made of closely woven microfibre that's water-resistant and windproof, breathable and soft. The 'biomimetic' lining keeps you dry by actively moving moisture away from the body. Extensive testing has apparently shown the wearer remains drier this way (due to the lack of condensation build-up) in eight out of 10 situation environments. Once a jacket has been bought, its owner can, at any point send it back to be reserviced, thereby extending the product's life, and even when it has reached the end of its practical life, thanks to the lack of any laminations, solvents or gluing in the manufacturing and a reliance upon 100 per cent polyester (the most easily recyclable synthetic fibre) it can be easily broken down or recycled.

Other garments make use of recycled polyester (the super-warm, ultra-light garment Etobicoke) or beeswax for weatherproofing (the Matanuska). Hoodies and sweatshirts are made from high-quality merino wool with a degree of loft. The fabric works with your body, keeping you warm when it's cool and cool when it's warm. The down side is that it's sourced, at present, from New Zealand.

'The problem is there's only one place in the UK, in Devon, where you can get the merino/Shetland mix we're after,' says Podkolinski. 'So we're working on sheep breeding programmes. If you're dealing with raw fibre you have to go back such a long way.' With the aim to localise more UK production – the company has projects in development with several factories – Finisterre will soon be able to control more of the production, from the raw fibre to the spinning, processing and weaving.

'I'm determined to make it possible, even if it means buying a flock and starting a Finisterre farm,' Podkolinski adds. 'Over the next few years you'll see the results of what we're developing, textiles-wise. This is just the first stage.' E

See **www.finisterreuk.com**

## Board of not being green

The original Hawaiians surfboards of 200 years ago were made from native trees such as the koa and wiliwili, but since 1950 the surfboard industry has been heavily reliant on petrochemical-based materials. Surfboards are petrochemical-based, they don't last (most people have a board for one year) and they're impossible to recycle.

Ninety per cent of modern boards – a million every year – are made using blown polyurethane foam, wrapped in fibreglass and coated in petroleum-derived resin. Dumped in landfill, they won't break down for millennia. On top of this is petroleum-derived surf wax, used to add grip to the surfboard, and neoprene wetsuits, a stretchy synthetic rubber material.

The dawn of the eco wetsuit has yet to arrive – although Finisterre's designer Tom Podkolinski is itching to have a go at designing one – but there are now several 'eco-boards' boards on the market.

**Homeblown** and **Sustainable Composites** are two Cornish companies that, with the backing of the Eden Project, have created an 'Ecoboard' – a core made from 40 per cent vegetable foam that's wrapped in hemp cloth instead of fibreglass, and is set in a new 96 per cent vegetable-based resin. See **www.homeblown.co.uk** or **www.suscomp.com**

**Ocean Green**, based in Nicaragua and the UK, has created an EcoFoil board based on a hollow, sustainably sourced, balsa wood construction wrapped in organic hemp or cotton cloth. See **www.oceangreen.org**

For the colder waters of the UK, **Hill's Organic Surf Wax** make a specially formulated wax using beeswax, virgin coconut oil and pine resin. See **www.hillsorganicsurfwax.org.uk**

# Beach 'n' swimwear

Need some ethical togs for your eco summer holidays? **Laura Sevier** has some suggestions

Fair Trade sarong, £25, by Chandni Chowk. Made with 100% organic cotton, hand block printed, unbleached and dyed with natural indigo dyes
**www.chandnichowk.co.uk**

Pink-and-brown elephant print 'Etosha' reversible bikini, £62, by Aaron Change. Made from recycled plastic bottles. Available from
**www.fashion-conscience.com**

Blue 'Watamu bikini', £26, by Lalesso. Made in Kenya from traditional khangas (long lengths of fabric worn by many East African women), Lalesso works with local community groups, paying them fairly, to keep printing and sewing crafts alive. Available from
**www.fashion-conscience.com**


Jute bag, £6.50, by Surfers Against Sewage
**www.sas.org.uk**


Cap, £15, made with 55% hemp and 45% organic cotton, by Surfers Against Sewage
**www.sas.org.uk**

Women's recycled polyester board shorts, £35, Howies
**www.howies.co.uk**

Recycled polyester board shorts, £30, from Howies
**www.howies.co.uk**

Hawaiian-print organic cotton tankini top, £8.50, bikini top, £5.95, and bikini/tankini bottoms, £5.50
**www.naturalcollection.com**


Bags of Change organic hemp/cotton mix bag, £16.85, with coconut shell buttons
**www.bagsofchange.co.uk**


**Suncream**
From left: The Organic Pharmacy, Lavera, Dr Hauschka, Neal's Yard, Weleda
**www.theorganicpharmacy.com**
**www.lavera.co.uk**
**www.drhauschka.co.uk**
**www.nealsyardremedies.com**
**www.weleda.co.uk**


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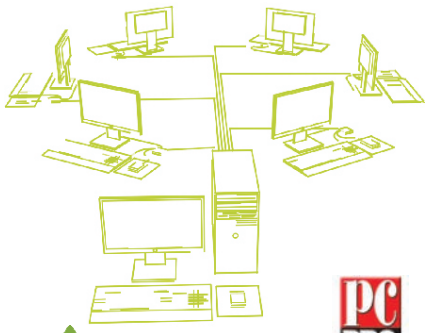

GreenHive™

PC PRO RECOMMENDED

"a call centre with 560 PCs could reduce its electricity bill by around £85,000 a year, simply by switching to GreenHive" Hexus.net, March 2008

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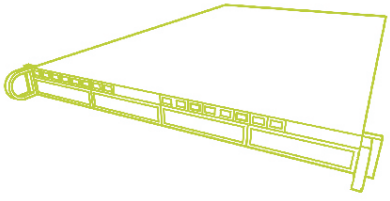

GreenServer

PC PRO RECOMMENDED

"sheer processing density plus low power consumption there's little to touch this server." Janus I, PC Pro, March 2008

## Power Usage of a PC in Watts (lower is better!)

| | | |
|---|---|---|
| Typical 3 year old PC | | **216W** |
| Modern PC | | **72W** |
| **GreenPC** 940BE | | **37 W** |
| **GreenPC** Treeton | | **29W** |
| **GreenHive** | | **9W** per user |

*figure are for towers only; excludes monitors, keyboards and mice

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# Paper, scissors, headstone

Our rampant consumption of paper is leading to a meltdown of the world's forests. **Maggy Haggith** wants us to use less

Paper – it's such a transient material. Our days are littered with it and we chuck it away so quickly: the morning news, envelopes, junk mail and photocopying, chocolate wrappers, lunchtime greaseproof bags and cardboard packaging, cinema tickets, TV listings and magazines – not to mention all those toilet rolls, kitchen towels and tissues.

It's shocking when you work out how much we get through every year. The average British person uses 250kg of paper annually. To get my head around what 250kg of paper looks like, I built a display in my village hall. It took six back-wrenching wheelbarrow loads to get it into position. People were stunned at the resulting paper mountain.

In the UK we virtually have no home-grown paper production – 80 per cent of our forest products comes from other people's forests. As a forest researcher, I have spent the past 10 years researching and campaigning for the protection of forests and the people dependent on them, working for the Centre for National Forestry Research, WWF and Greenpeace.

I'm lucky enough to have visited many of the world's great forests in Russia, Borneo, the Amazon and Canada. There is nothing like pristine forests. Being British, we don't know what it is like. I live on a woodland croft in the Highlands of Scotland, but even here the forests are 'semi-natural', rather than pristine old growth.

I have realised that the main threat to the forests of the world is consumption. It is consumer demand that is driving the destruction. Nearly half of all logged timber is used to make paper, and 70 per cent of the wood used comes from natural, pristine forests, not plantations.

The harmful impacts of paper production are felt not only by forests, however. Their destruction is releasing carbon from the trees and the soils beneath – deforestation is responsible for an estimated 20 per cent of global $CO_2$ emissions. It takes as much energy to make a tonne of paper as it does a tonne of steel, and more water than any other industrial product. The main production impacts result from the toxic chemicals used in pulping and chlorine bleaching to make paper whiter. Pollution to air and watercourses and the release of heavy metals in solid wastes have caused ill health and contaminated land around the world. The pulp and paper industry is also involved in abuses of human and land rights, particularly by taking land from indigenous peoples to grow trees for fibre for paper. Forest destruction won't stop until everyone stops making money from it – which, at the consumer end, means reducing demand.

As a Briton, I want to do something about our demand. I helped set up and am now the co-ordinator of The Environmental Paper Network, a coalition of 52 organisations in 21 countries that aims to make the European paper industry more sustainable. The network focuses on two areas. The first is reducing consumption (see www.shrinkpaper.org). We work with corporations on this, too – banks, for instance use huge amounts of paper. The second is working with finance, persuading them not to fund unsustainable mills. There are plans for 50 new pulp mills to be built, all in remaining forest areas. We've had some success with this already.

I believe that paper, like cats, should have nine lives. It can be recycled at least five and up to 10 times , but even recycling has negative impacts, namely 'waste miles' – a scandalous 68 per cent of waste paper exports go to Asia, mainly China.

The real answer is to reduce paper consumption and stop wasting paper. Break some of your paper habits today and you will definitely feel better for it. Less is best.

**As told to Laura Sevier**

**To buy Mandy Haggith's *Paper Trails* (£12.99) for the special price of £10.99, including free UK P&P, call 01206 255 800 and quote the ref 'Ecologist'.**

## Maggy Haggith's tips on saving paper

- Think before you print, or print double-sided
- Don't accept fliers or free papers
- Share magazines and newspapers
- Reuse envelopes
- Use scraps of paper instead of Post-it notes
- Use recycled toilet paper
- Carry a handkerchief instead of tissues
- Limit junk mail by registering with the Mailing Preference Service – see **www.mpsonline.org.uk**

# Ice cream of the crop

Most mass-produced pudding wouldn't know real, healthy, organic ingredients if it saw them. **Laura Sevier** meets the Finlays, who are busy putting the 'nice' back into ice cream

Conjure up an image of mint choc chip ice cream and the chances are, you're picturing a light-green colour with brown flecks. But Cream o' Galloway's mint choc chip is the colour of vanilla.

'We only use natural ingredients with no added flavours or colours, so no green colouring for us!' explains Wilma Finlay, who with her husband David, a farmer, set up the ice cream-making business in 1992.

Based at Rainton farm in the rolling hills of Galloway, near the coast of south-west Scotland, the farm has 850 acres of rugged grassland that makes ideal grazing for the couple's organically reared cows and sheep.

> "At their small but prolific factory ice cream is made the traditional way, with fresh milk, real cream and eggs

All the milk used in Cream o' Galloway ice cream is organic and comes from the Finlays' own cows. At their small but prolific on-site factory – they produce 200,000 litres a year – ice cream is made the traditional way, with fresh milk, real cream and eggs, and using natural ingredients such as raspberries, honey or whisky for flavour. It's the kind of ice cream you might make in your kitchen.

You'd think all ice cream would be made this way, but far from it. Much of the mass-produced gunk you find in a supermarket contains ingredients such as reconstituted skimmed milk, glucose syrup, vegetable fat, glucose fructose syrup, whey solids, artificial emulsifiers, stabilisers, colouring and flavouring. This 'naughty but nice' treat has strayed a long way from its roots.

By keeping its ingredients pure and simple, however, Cream o' Galloway has created an altogether more enticing and, by comparison, healthy ice cream that allows the flavours to speak for themselves – so the strawberry really does taste of strawberry.

The company makes 30 flavours, eight of which are entirely organic. 'In the future we hope to convert the whole range to organic,' says Wilma.

The Finlays source locally wherever possible – biscuits and cookie ingredients are from local bakeries – and last September branched into Fairtrade territory with their 'Cream o' Galloway Made Fair' range, also certified organic, which includes vanilla, strawberry pavlova, chocolate, cappuccino and two frozen-fruit smoothies. All sugar, vanilla, coffee and cocoa used in the range is from Fairtrade sources. 'You almost need a whole department to deal with the paperwork,' says Wilma, 'but it is our aim that any new products in the range will be ethical and fairly traded.'

While Wilma is the driving force behind the ice cream business, David is the organic farming expert. His family have farmed the land at Rainton since 1927, and he took over the running of the farm 20 years ago.

'For the first 10 years I intensified

the farm, with 25 per cent more cattle and two and a half times as many sheep – with less employees,' he says. 'The amount of fertilisers, herbicides and vaccines I used doubled and the amount of antibiotics trebled. If there was a problem I hit it with a chemical.'

Like many farms in the late 80s and early 90s, however, Rainton had a tough time. Costs were going up and the Finlays were getting less income from their produce. 'The value of lamb, beef and milk barely changed between 1985 and 1997,' says David. 'There was a huge pressure to intensify.'

Then came a complete change of direction. First, in 1992, they decided to start making ice cream, and then, in 1999, to go organic. 'It took me two or three years to persuade David that organic was a good idea,' says Wilma.

Initially reluctant, he was interested enough to try, in spite of the fact that his father, friends, colleagues and farm staff were against the idea. Now he is a big enthusiast. 'We're saving £35,000 a year on fertilisers and pharmaceuticals. We've reduced our stock numbers by 25 per cent so there is more space for each animal. Disease levels have dropped. Even if the whole thing goes pear-shaped I'd never go back to farming with chemicals,' he says. 'I want to understand nature, to work with it and not dominate it.'

Whereas David's father ('Grandpa Finlay') spent most of his time trying to improve the farm's agricultural productivity by draining, destroying habitats and chopping down trees, bushes and shrubs, all which was part of the farming philosophy of the time, David has done the opposite. He's planted 75 acres of native species woodland (40,000 trees), created wetland habitats and dug three new ponds to encourage wildlife to thrive. 'It's so much more vibrant here, with sparrowhawks, buzzards, rooks and many species you'd normally only see in a nature reserve,' he says. 'Plus, the animals get a much more mixed diet because there are plants and herbs to feed on that wouldn't have grown when we used to spray everything.'

Now even Grandpa Finlay, aged 84 and still actively involved in the farm, is an organic fan. With 19 grandchildren, he worries about climate change and peak oil. He believes all farmers will have to learn how to farm without chemicals – and that there will be food shortages akin to what he experienced during World War II – or worse. Wilma and David have similar concerns, and are increasingly looking into renewable energy systems. The farm is already the site of a community-owned wind turbine and the Finlays are currently installing ground-source heat pumps.

**Above**: Cows at Rainton farm are farmed organically
**Right**: Just one of the 30 Cream o' Galloway flavours
**Opposite**: Wilma and David Finlay, organic ice cream entrepreneurs


## Other brands to try...

- **Roskilly's of Cornwall**

Ice creams and frozen yoghurts made using the rich organic milk and cream from the Roskilly's Jersey herd. The company makes many of its own ingredients, such as fresh fruit jams and fudge with no preservatives. Real fruit sorbets are made using the water from the farms spring. **www.roskillys.co.uk**

- **September Organic Dairy**

September Organic has been making ice cream for nearly two decades. It uses milk from a local herd of Jersey cows, double cream from selected herds of Friesian cows, eggs from a nearby farm and real ingredients such as local strawberries. Flavours include Elderflower Cream, Blackberry & Apple Crumble and Brown Bread. **www.september-organic.co.uk**

- **Rocombe Organic**

Made in Devon since 1987, Rocombe Organic was the first certified organic dairy ice cream to be produced in the UK. It uses local organic whole milk and cream to create ice creams that are 100 per cent natural and free of additives and stabilisers. **www.rocombe.com**

### Flavour of the month

More than merely a farm and an ice cream factory, the couple have transformed the site into a lively environmental education centre, popular with schoolchildren, tourists and locals. They have around 70,000 visitors each year and employ 17 permanent staff and an additional 35 seasonal. There are farm tours (Rainton is one of the Soil Association's demonstration farms), 'meet the lambs' sessions, bat-spotting nights, Eco Fun Days, nature trails and an adventure playground. Farm buildings have been converted into a shop, an ice cream parlour and a 'Burger Barn', which serves burgers made from the dairy male cows. 'There's not much of a market for them, so most other people have them shot,' says Wilma, 'but we let them live up to three or more years till they beef out a bit. We call them the "burger boys".'

The family won the BBC Radio 4 Farmer of the Year award in 2006 in recognition of their work on organic farming, education and diversification, and have won numerous other awards for contributions to tourism and the environment. Most recently Wilma herself was recognised with an MBE.

What does she most enjoy about running Cream O Galloway? 'Everyone expects me to say the tasting sessions, but for me it's about having the independence to run your business following your principles. I find that so much more satisfying than having to implement corporate decisions that I don't buy into.'

# Green Shopping Guide


**ADVERTISING POLICY** Every advertiser featured in the *Ecologist* has been vetted to ensure its products or services don't damage the environment, the people it employs or the consumer

READER OFFER

## Peter Rabbit

**Win a gift set**

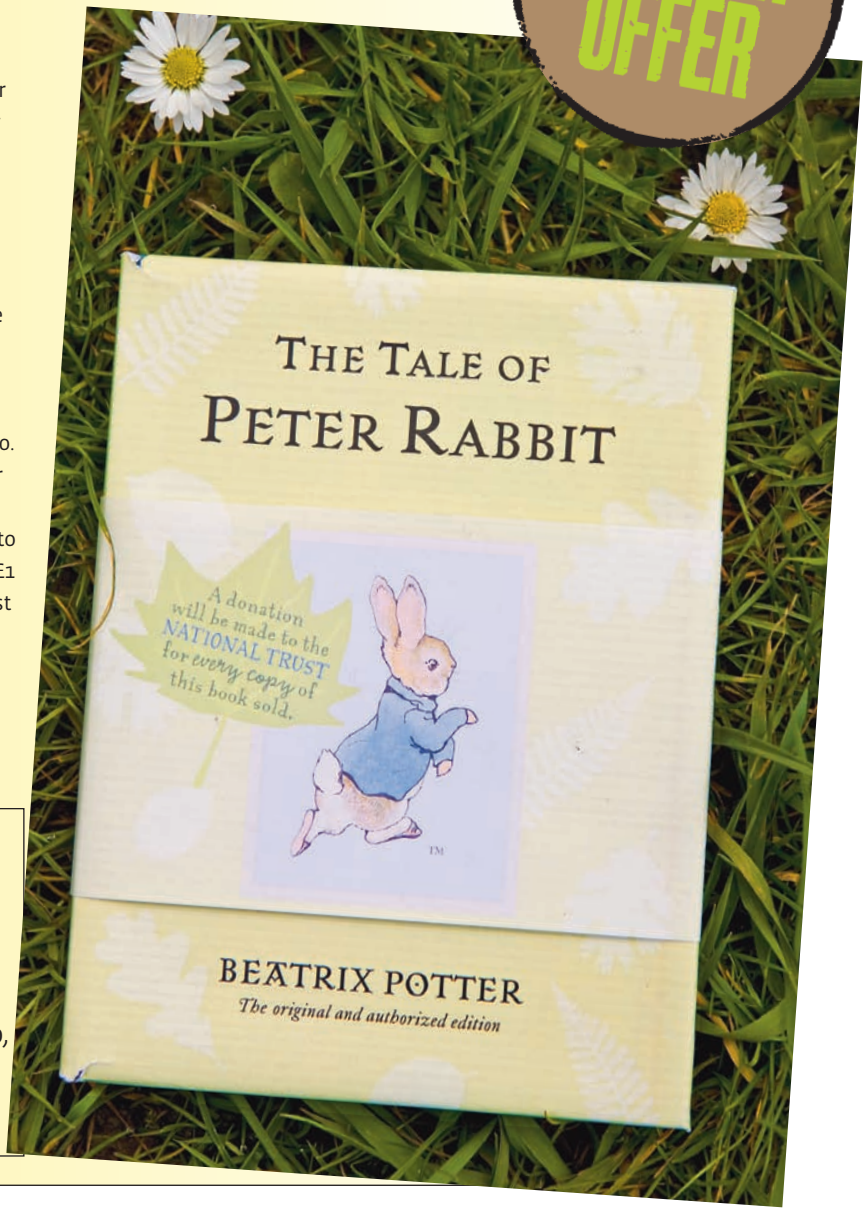
Peter Rabbit is going green. This summer Frederick Warne & Co, owner of The World of Beatrix Potter classic children's character property, has announced the launch of Peter Rabbit™ Naturally Better, a new global environmental and ethical initiative.

Peter Rabbit, created by Beatrix Potter in 1893, is the oldest licensed character in the world. The Original Peter Rabbit™ Books have sold more than 150 million copies in 35 languages.

The Peter Rabbit™ Naturally Better initiative embraces all the values of the Peter Rabbit stories, reflecting the importance that Beatrix Potter herself placed on the natural world and the environment. It offers parents and children sustainable books and toys, organic and natural toiletries, additive-free confectionary and organic food under the 'Naturally Better' logo.

To celebrate the launch of the Peter Rabbit™ Naturally Better range, a special edition of *The Tale of Peter Rabbit* (RRP £5.99) is being published with a striking green cover printed directly on to the book's board from responsibly managed FSC sources. Plus, £1 from the sale of every book will be donated to the National Trust tree-planting project to replenish parkland in the Lake District.

There are 10 gift sets to give away, which include the special edition of *The Tale of Peter Rabbit*™ ( worth £5.99), the *Peter Rabbit™ Naturally Better Baby Book* ( worth £9.99) and some baby-friendly Get Fresh Baby Toiletries (worth £9.99).




**How to enter**

**Answer the question below:**

**What is the name of the new green initiative being launched by Peter Rabbit™?**

Please send a postcard (by 1 September) with your answer, name, email and address to: Jennifer Norton, *Ecologist*/Naturally Better Comp, Frederick Warne, 80 Strand,London WC2R 0RL. Respondents will be entered into a draw and will be notified by email.

# Home & Garden

*From garden tools to bed linen, cleaning products and furniture – simply by changing our household buying habits we can reduce our carbon footprint and the chemical cocktail that makes its way into our homes. So visit the online producers below for ideas on how to green your home*

# Recruitment


*Ethical recruitment is about finding the right person, with the right interest and the right mindset for the job. With the current business marketplace doing its part to make the world more sustainable, Ethical Recruitment is putting pressure on big and small businesses alike. Whether you are looking to start a new career, further an existing one or find the best possible candidate,* Ecologist *Recruitment has positions and people from charity and finance to science and engineering*

# Finance

*Ethical finance is about taking control so that your finances are not tied up in deals you wouldn't like – like trade with oppressive regimes or funding dirty coal plants, oil extraction and unsustainable logging operations. Ethical banks finance companies and projects that benefit people and the environment so your money is working for – not against – the world*

## Triodos Renewables

Triodos Renewables, the trading name of Triodos Renewable Energy Fund plc, was established in 1995 and invests mainly in small to medium-scale wind farms, hydro-electric schemes and emerging renewable energy technology companies in the UK.

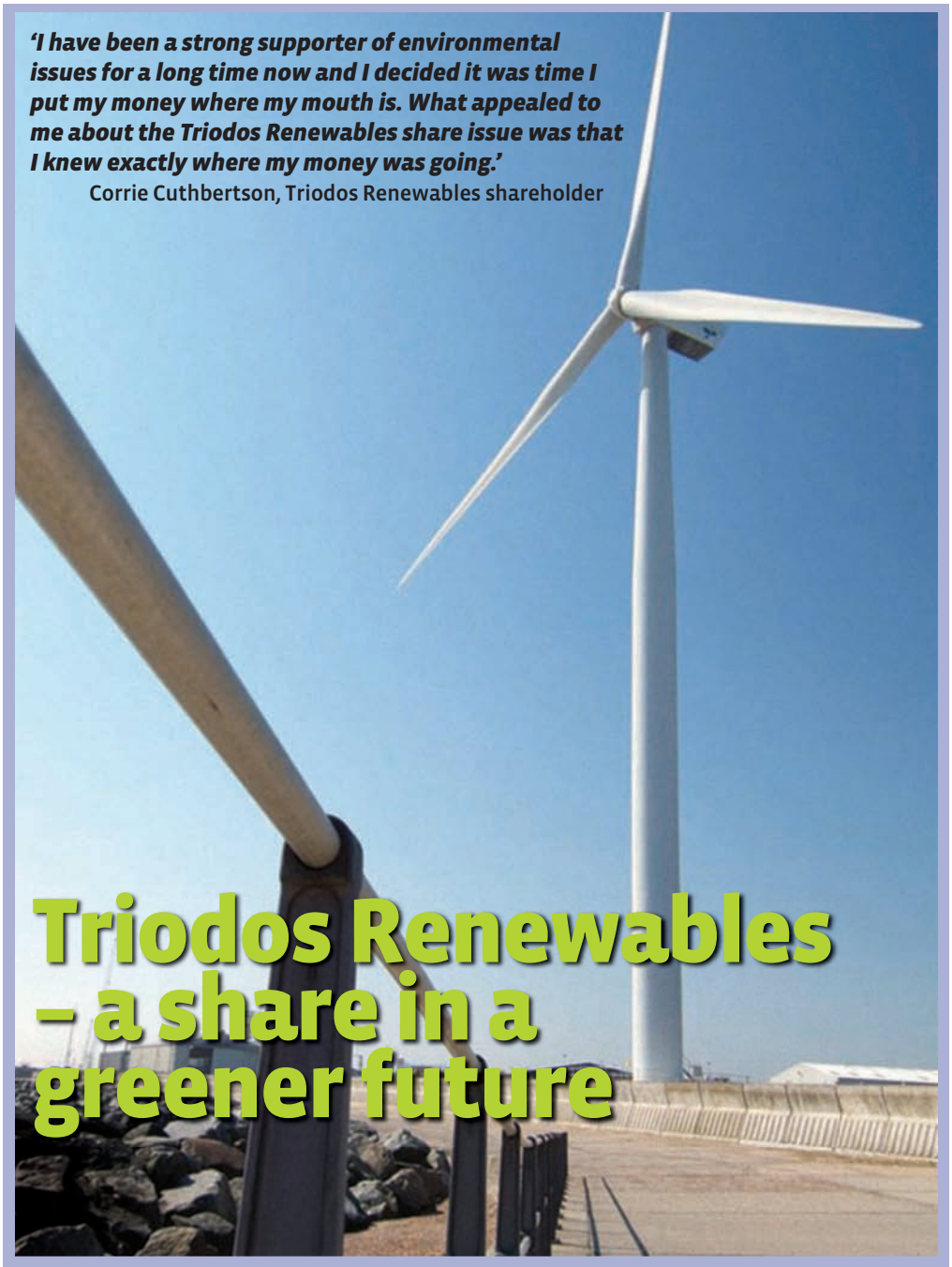
**The projects Triodos Renewables owns and operates include:**

- **Beochlich**
A sensitively designed hydro-electric project in Argyll, West Scotland. Electricity output: 1,000 homes.[1]
- **Ness Point**
One of the UK's largest onshore wind turbines in Lowestoft, Suffolk. Electricity output: 1,750 homes.[1]
- **Caton Moor**
A repowered wind farm with eight turbines in an upland area of North Lancashire. Electricity output: 10,000 homes.[1]

**Triodos Renewables also invests in sustainable energy companies:**

- **Connective Energy**
Connective Energy plans to become a leading supplier of low-carbon heat solutions by using waste heat to displace primary electricity generation sources.
- **Marine Current Turbines**
An innovative tidal technology company in Northern Ireland's Strangford Lough.

[1] All 'home equivalents' comparisons refer to the amount of electricity needed to meet the needs of a home based on average UK domestic electricity consumption.



***'I have been a strong supporter of environmental issues for a long time now and I decided it was time I put my money where my mouth is. What appealed to me about the Triodos Renewables share issue was that I knew exactly where my money was going.'***
Corrie Cuthbertson, Triodos Renewables shareholder

# Triodos Renewables – a share in a greener future

**One of the most powerful things we can do to combat global climate change is support moves to generate our energy from renewable sources such as wind, solar and hydro. With Triodos Renewables, you can choose to invest in renewable energy and act to tackle climate change.**

Since its last share issue in 2005, Triodos Renewables has grown considerably, from acquiring one of the UK's largest turbines to a stake in Marine Current Turbines, a groundbreaking company installing the world's first commercial tidal turbine. The company plans to use the money raised to more than double the amount of green electricity it produces in the next two to three years.

To take part in the share issue, **email us at renewables@triodos.co.uk or call 0845 478 6361** and we'll send you a prospectus and application form. For more information, visit **www.triodosrenewables.co.uk**

*Triodos Renewables is the trading name for Triodos Renewable Energy Fund plc. Registered office: Brunel House, 11 The Promenade, Bristol BS8 3NN.*

# Home & Business Services

*If you're looking to green your company by changing suppliers or use more ethical services in your everyday life, this list of business and service suppliers offers an eco solution. Alternative office supplies, ethical finance and getting to meetings, this range of companies shows your business can be greener and greater than before*



**Ecotip**

**Plan for winter**

Notice how cheap your energy bills are in the summer? Keep them that way by devising an alternative energy plan for your business. If you are near water, consider setting up a hydro-power system and selling the surplus back to the energy company or introduce biofuels to heat your hot water. Find renewable alternatives at **www.reuk.co.uk**

# Clothing

*The virtual boutiques and retailers featured on these pages stock a range of well-made, stylish and ethical clothes. Precise sizing charts make it easy to find the right size for you – and if something doesn't fit, or you don't like it, simply return it. Being fashionable and being ethical are no longer at odds...*

# Health & Beauty

*The best way to ensure healthy skin is to maintain a healthy diet, get enough sleep and keep stress levels low. If you do buy products for your face or body, try to make sure they are based on natural ingredients. These companies carry products that have not been tested on animals; they contain no parabens, petrochemicals or synthetic ingredients*




**Ecotip**

**What is natural?**

Many beauty products claim to be natural, with only one or two plant-derived ingredients. As there are no regulations for 'green' cosmetics, labeling is self-governed by the industry and may be misleading. Always check the label – you can look up the ingredients on The Environmental Working Group cosmetic safety database **www.cosmeticdatabase.com**



# Food & Drink

*The producers on the following pages supply genuinely fresh, seasonal fruit, vegetables, fish and meat. And in most cases you can order online and have everything delivered direct to your door. You can also feel safe in the knowledge that you're buying environmentally sound, delicious food that supports small, independent producers*



# Holidays

*There are plenty of ways to take a planet-friendly break and be an ethical traveller, from staying in a yurt in Devon to ecotourism holidays that benefit local communities and the environment. See below to find out about places in the UK and abroad where you can holiday with a green conscience*



**Ecotip**
**UK summer pilgrimage**

Celebrate the British Isles in all their summer glory by making your own pilgrimage. Wander to new places that you have always wanted to see, take tracks you didn't plan and meet people you'll always remember. Find a map, pick a starting point and just get going.

# Courses & Events

*Whether it's professional training you're after or a book that can teach you how, ideas that can change the world or practical skills to help with sustainable living, this is the place to find out about courses, books and websites that will equip you with more information on how to help people and planet*

**Ecotip**

**Summer schools**

Throughout summer, many universities hold summer schools. Learn about green politics, environmental policy or sustainable management. Contact your local college or university to see what they have on offer or see **www.hotcourses.com** to conduct a UK-wide search.

# A perennial classic

Hardy, long-lived and self-sufficient, perennial vegetables are a gardener's dream. From rhubarb to the air potato, **Clive Dennis** finds out more about a gift that keeps on giving

In 2005, David Jacke and Eric Toensmeier burst on to the permaculture scene with the publication of the two-volume bible of temperate forest gardening, *Edible Forest Gardens*. Not content to rest on his laurels, so to speak, Toensmeier has been keeping himself busy by writing this latest addition to the permaculture canon: the first book ever on the topic of perennial vegetables.

Perennial vegetables enjoy a number of advantages over annuals – for a start, they minimise work by not having to be planted every year, and their longer lifespans allow them to build up bigger root systems, meaning they can mine the subsoil for nutrients and minerals, and require less watering. Aside from rhubarb, asparagus and globe artichoke, however, we are largely unaware of the perennial vegetables potentially available to us. In this well-organised book, more than a hundred perennial vegetables are described, with plant histories, tasting notes, growth habits and preferences, hardiness ratings and potential pests. Though primarily aimed at North American gardeners, most information is highly relevant to Europeans too.

The Andes turn out to be a source of all sorts of interesting crops, such as *oca*, a relative of our native wood sorrel, whose tubers taste like potatoes with sour cream – essentially a perennial ready-meal; and *canna*, a plant already familiar to gardeners as an ornamental, but which also produces good crops of roots in damp marginal soils. It is, however, the improbable 'air potato' that stands out in this book for its pure vegetable insanity. Capable of growing to more than 50ft, air potato is a variety of yam that produces heavy crops of aerial tubers, which hang from the vine-like fruit. Obviously, this plant counts as incontrovertible proof of the existence of a benevolent creator-being.

Also included are plant lists for different climate types, nursery and seed company addresses, as well as sections on plant care, propagation, fencing, mulching and other techniques useful for the establishment of a perennial garden. If you are an adventurous gardener who wishes to grow more food for less work, this is the book to get you started.

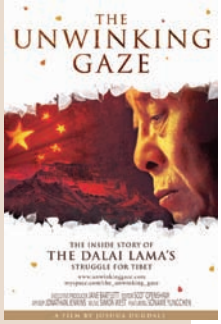

**Perennial Vegetables**
Eric Toensmeier
(Chelsea Green Publishing, 2007)



DVD

## The Unwinking Gaze: the Inside Story of the Dalai Lama's Struggle for Tibet Joshua Dugdale

Although the Dalai Lama says he is 80 per cent monk and 20 per cent politician, the focus of this documentary is largely political. Filmed between 2004 and 2007, film-maker Joshua Dugdale was privy to the Dalai Lama's public appearances, private audiences and important meetings. It shows his painstaking and frustrating efforts to lead his people to a peaceful resolution with China, and to engage its government in negotiations towards what he calls 'meaningful autonomy'.




A key moment comes when it transpires Chinese representatives have been mistranslating the Dalai Lama's speeches, confusing 'freedom' for 'independence'. The Dalai Lama – on behalf of the Tibetan people – gave up the claim for independence back in the 1980s.

A timely, important film, *The Unwinking Gaze* reveals the world of the man dubbed a 'splittist' and canny political operator by the Chinese, with the hope Beijing might make more informed decisions in their dealings with him. Wisely, Dugdale decides against a voiceover, so the Dalai Lama's voice is heard. Against the backdrop of this agonising struggle for Tibet, his sincerity, inner strength and sense of humour shine through. **Laura Sevier**

**To buy the DVD, see www.unwinkinggaze.com**

# Plan C for cheerless

## Heavy on the moralising, light on cheer, a new book on low-carbon living has **Phil England** reaching for the classics

It was only a few issues ago that we reviewed *Plan B*, a book by former White House policy advisor Lester R. Brown. It laid out a comprehensive action plan for solving not only climate change and peak oil but also overpopulation, poverty and environmental degradation. Brown costed it at $190 billion a year – a sixth of annual 'defence' spending – and pointed out that this would address our most pressing security threats.

Hot on its heels comes a rival plan from fellow American Pat Murphy, director of the inspiring film *The Power of Community – How Cuba Survived Peak Oil*, which has been shown by countless Transition Town groups across the UK.

Murphy argues that renewable energy and energy-efficient appliances only go so far, and that we also need voluntary behaviour change and more local, community-oriented lives. Practically, he advances some interesting ideas about an advanced car-sharing scheme (the 'smart jitney'), retrofitting housing to the zero-carbon Passivhaus standard and moving down the food chain to a more plant-based, unprocessed, local and organic diet.

While adopting low-carbon lifestyles affords great benefits in personal wellbeing and environmental protection, Murphy isn't the best person to sell the message. His tone is often moralising and pessimistic, painting a picture of painful sacrifice rather than joyful gain. Others do this much better – our own Tom Hodgkinson, Transition Town pioneer Rob Hopkins and Andrew Simms of the New Economics Foundation to name a few.

Nor is the wider context for community and individual action addressed. There is no mention of the need for a global agreement – whether Contraction and Convergence, Oliver Tickell's Kyoto II and/or an Oil Depletion Protocol – or national frameworks such as the UK's (pioneering but currently fatally flawed) Climate Change Bill and Tradeable Energy Quotas. Rob Hopkins is clear we need all these mutually reinforcing responses. For scaling the benefits of your carbon-conscious lifestyle up to community level, Hopkins' recent *Transition Handbook* is a much better place to start.


**Plan C: Community Survival Strategies for Peak Oil and Climate Change**
Pat Murphy
(New Society Publishers, £11.99)

DVD

### Plagues and Pleasures on the Salton Sea **Chris Metzler and Jeff Springer**

A sobering, disturbing yet humorous look at the journey of a holiday resort 50 miles south of Palm Springs from utopia to apocalypse. Hailed as the Californian Riviera in the 1950s, the man-made Salton Sea has become 'the greatest sewer in the world' – a stagnant, foul-smelling and increasingly saline lake in the middle of the desert, causing the death of thousands of fish and birds. Its shores are bleak wastelands lined with communities battling ecological and commercial demise, lack of facilities, boredom and increasing crime and mortality rates. Despite efforts to restore the area to its former glory, public interest in the Salton Sea has faded since the death of its most prominent advocate, musician-turned-politician Sonny Bono, and hope for a revival is evaporating as fast as the lake itself, sustained only by rainwater as transfer deals divert water from the Colorado River to more vibrant locations. Interviews with residents and activists cut with original newsreel footage paint a moving picture of the American Dream turned foul due to human intervention in nature and a shocking lack of remedial action. **Manuela Hübner**

# Last words? Ch'orti'

**Status:** Endangered; probably around 15,000 speakers, but this language in decline is the weakest link left over from the ancient Mayan civilisation.
**Habitat:** Southeastern Guatemala and parts of western Honduras, where it is almost extinct.
**Description:** Mayan languages today are like an archipelago of sunken peaks sticking out from the engulfing sea of Spanish. Ch'orti' is a direct descendant of what was once spoken across the region when that supremely advanced culture was at the height of its powers, before the arrival of the conquistadors in the 16th century.

The closeness of the Ch'orti' to the land means that linguists investigating have found themselves learning almost as much about the local flora and fauna as the language in question. The Ch'orti' traditionally subsisted on maize and bean farming, but modern agricultural methods have threatened their way of life. Following the requisition of much of their territory, and to avoid persecution by the anti-indigenous Guatemalteco government in the 1980s, many Ch'orti' emigrated to the USA.

We find in Ch'orti' a repository of unusual linguistic terms or specialised verbal expressions – *b'o'b'a'* means 'to breathe while opening and closing the mouth', while *mak'i* is 'to eat soft foods' or 'drink thick liquids'.

One very interesting experiment is being developed among Ch'orti' speakers. The Academy of Mayan Languages is providing neologisms (purpose-built new words) in Ch'orti' to replace phrases and terms that have been borrowed from Spanish. How much success these will have in take-up among the general Ch'orti' populus remains to be seen, but rewriting the present state of the world (represented by these neologisms) in their own terms is a possible way of carrying the language into the future.
**David Hawkins**

# How to be free
## Stepping into the ring

Eco wittering and the corporate hijacking of the Hay festival encourages direct action knife-thrower **Tom Hodgkinson** to run away and join the circus

At the end of May, I went to give a talk at the Hay-on-Wye literary festival. John Bird, of *The Big Issue*, and I, sang songs to my ukulele accompaniment and enthused about the pleasures of thrift. That was fun, although one woman in the audience was incensed by what she saw as a trivialisation of a serious issue. The festival overall was characterised by a lot of hand-wringing and fruitless wittering about environmental issues, and a lot of silly lip service was given to ecology from giant world-wrecking sponsors such as Sky and Barclays. The whole thing was fairly sick-making, as they say in *Decline and Fall*. So it was a relief to take a break from the wittering and go to Giffords Circus, which was camped out on the edge of town by the river.

I don't know if you've ever seen a circus that made you cry, but that's what Giffords did to me. There was some spirit in the thing, some artistry, creative genius or spark of true love, a generosity – some transcendent quality, anyway. I'm really at a loss to explain why a 40-year-old man would find himself sobbing at the sight of East European tumblers spinning each other in the air with their feet. Perhaps because here someone was doing something real: not moaning like Monbiot and the rest of the environmental whingers; not complaining, just getting on with a joyful form of artistic expression.

Throughout the performance rousing music is kept up by a sort of Balkan gypsy band, with fiddle and horns and lots of drums. There are Shakespearean elements: mad Ophelia and a marriage and a superb clown. There is mind-blowing prancing from the ponies and at one point a hawk flies around the big top. It is breathtaking – I mean, I was actually short of breath at certain moments. There is tightrope-walking, fire-juggling and an enormous sense of freedom. The circus is small and intimate, and really it's the best thing I've seen for years. I wanted to join it. Not that I can do anything. Maybe I could play the ukulele in the band?

To add to the charm, the whole shebang is horse-drawn and car-free, and the circus workers live in beautiful painted caravans. The costumes are lavish and sumptuous, the performers impossibly glamorous and beautiful. It's stunningly romantic, thrilling, exotic; it's intimate and it's a remarkable achievement. In a world of smoking bans, grey boredom and increasing restrictions on one's activities, Giffords is a beacon of liberty and joy.

'We were thrown out of the Hay festival for slashing a United Emirates banner as a protest against the rash of sponsors all over the festival'

So who is the genius behind this stunning creation? Giffords was founded in 2000 by Nell Gifford, who is Britain's only female circus owner. Folk say the creation of the circus was related to the trauma of her mother's coma. Nell had always been circus-obsessed and had a vast accumulation of knowledge of its history. She started working for circuses in her late teens. She was known as a 'josser' or outsider, but was eventually promoted to ringmistress at French circus Santus. I salute the courage and the conviction of Nell and her husband in getting this terrific show on the road.

Two days afterwards, my friend Penny Rimbaud, Crass co-founder, and I were thrown out of the Hay festival for slashing a United Emirates banner as a protest against the rash of sponsors all over the festival. Barclays Wealth was the other particularly hideous banner. Penny did the slashing and I provided the knife, which meant he was arrested while I was only escorted off site. Penny reports the police, while not condoning his action, were broadly supportive of the spirit that inspired it. His courage was applauded by a family who approached him after his release to congratulate him. Like the circus, there was something moving and affecting about Penny's action, and it said more than a million literary events. Like Giffords, there was something joyful and life-affirming in what he did.

It may seem odd for an idler to recommend direct action, but I think we need to go out into the streets and the fields of this country and recreate the spirit of Merrie Old England, before vast governments and corporations were born, before we'd had the spirit conditioned out of us, when the country was covered in strolling players and animals, and when life was lived with a passionate intensity rather than a supine and resigned passivity. E

**Giffords Circus is touring until 8 September, see www.giffordscircus.com**

Illustration DAVID HUMPHRIES

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