

BEATING THE RECESSION Why a sustainable agenda must prevail

ECOLOGIST

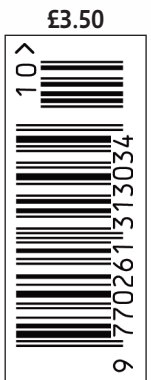
THE WORLD'S LEADING ENVIRONMENTAL MAGAZINE www.theecologist.org

SPECIAL REPORT

meat

**ECO VILLAIN
OR VICTIM
OF SPIN?**

THE BEAUTIFUL GAME
Why the grass really is greener at Dartford FC



OCT 08

ECOLOGIST
OCTOBER 2008
THE VITAL STATISTICS OF MEAT
STAYING GREEN IN THE DOWNTURN
RECYCLING HUMAN WASTE
ETHICAL FASHION
FOOTBALL'S ECO STADIUM
GREEN WASHING

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Editor, the Ecologist

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Food and Sex

Welcome to the new look *Ecologist*, which, I hope, will make negotiating our monthly cornucopia of in-depth investigations and stories a little easier for everyone.

More important than what's on the outside, however, is what's on the inside – which is as thorny as ever. Reading our special investigation on meat I am reminded of Swift's *A Modest Proposal*: 'I have been assured by a very knowing American of my acquaintance in London, that a young healthy child well nursed is at a year old a most delicious, nourishing, and wholesome food, whether stewed, roasted, baked, or boiled...'

In these days of rising food prices, dwindling oil reserves and population explosion, to suggest that we can, even should, continue to eat meat is to be greeted with the same horror (and no doubt endless letters of protest) that greeted that biting satire. But Swift's 'solution' to poverty – that the poor should feed themselves by eating their young – is as simplistic and makes just about as much sense as suggesting, as the near daily onslaught of emails and letters we receive at this office do, that the world can save itself from its current crises simply by not eating meat. Certainly the way we raise livestock is morally reprehensible and wilfully environmentally damaging; but is giving up meat the only, or even the best, solution?

No matter which way we looked at it, the strict veggie/vegan option just did not prove to be the saviour of planet or people. The debate and the data are complex, and in the end it's not so much what you eat as how it is produced that carries the greatest weight.

Thus, does ruminant flatulence contribute to global warming? Yes, but the argument is one of scale. If we all ate less meat, the methane from ruminants could not be used to distract us from more dangerous polluters.

Is meat-production energy intensive? Yes again, but as Simon Fairlie contends (page 16), only if we accept that industrial scale is the only way to produce 'enough' to meet our needs. Does meat contain unhealthy fats we could do without? Richard Young (page 20) argues that industrialised meat – beef in particular – has the highest levels of saturated fats. Meat from grass-fed cows has a dramatically better mix of 'good' fats, including omega-3.

The IPCC's Rajendra Pachauri says cutting out one meat meal a week could save the planet. Compassion in World Farming believes we should cut our consumption by 60 per cent by 2020. Our investigation suggests that figure is spot on for planetary wellbeing and human health. In short, if there is a universal model for healthy eating (apart from local, fresh and organic) it is Michael Pollan's dictum: 'Eat food. Just a little. Mostly plants'. But why wait until 2020, when it could be too late? The time to start is now.

Then there's the issue of sex. Eric Francis's comment (page 87) about the way chemical pollutants might influence not just the physical manifestations of our sexuality, but the emotional and behavioural ones – literally how comfortable we feel in our own skin – takes us into tricky territory. It's challenging reading, and yet a recent study at the University of Liverpool found that the Pill may disrupt women's natural ability to choose a partner genetically dissimilar to themselves. Bad news for the survival of the species. Bottom line, if the food we eat can change us biochemically to such a degree it alters our behaviour and choices – I'm thinking of our 2006 investigation into the links between violence, criminal behaviour and diet – then so can the industrial hormones we're exposed to on a daily basis.

Both of these issues need a bigger platform, and shocked, relieved, appalled or in total agreement, I look forward to your feedback, as always.



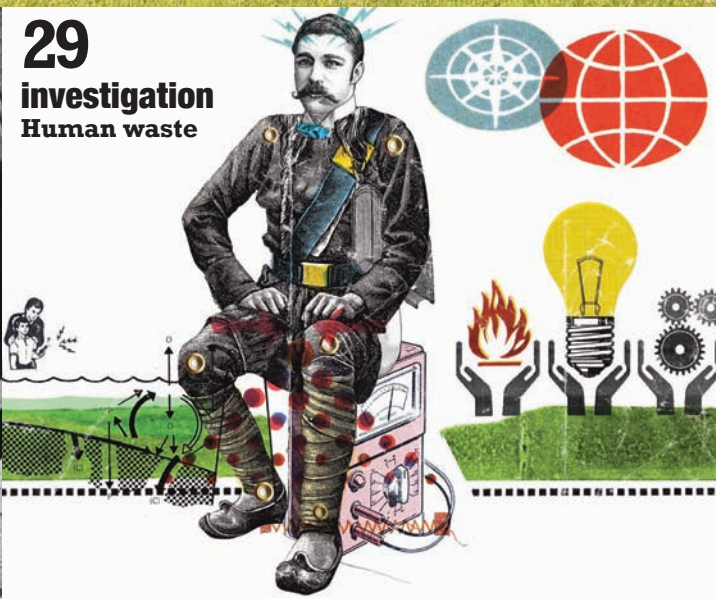
If there's a universal model for healthy eating it's Michael Pollan's dictum: 'Eat food. Just a little. Mostly plants'



41
take action
The beautiful game



24
investigation
Beating the recession



29
investigation
Human waste

investigation special report

14 **Meat: Eco villain or victim of spin?**
Livestock production takes a heavy toll on the planet, but as *Simon Fairlie* and *Richard Young* find, giving up meat may not be the most sustainable way to live

24 **Beating the recession**
The mainstream media may be bored with green issues, says *Stephen Hale*, but consumer commitment is still strong – and so too is corporate commitment, says *Tensie Whelan*

29 **Human waste**
We need to make excremental changes. *Mark Anslow* says it's time to reuse, recycle and rejoice in the ultimate renewable resource

take action

35 **Campaigns**
Want to do something about the stories you read in the *Ecologist*? Here's how. It's never been easier to stand up and be counted

36 **Take a ride on the veggie bus**
As long as there is fish and chips on the Brighton sea front, these wheels will keep rolling. *Jan Goodey* meets the driving force behind the Big Lemon bus

41 **The beautiful game**
With its grass roof, solar panels and rainwater-harvesting, football has a new eco home at Dartford FC. *David Craik* wonders whether Wembley will be able to play keepy-uppy

46 **Mycological madness**
Our resident forager *Fergus Drennan* celebrates this season's festive fungi

48 **Ecologist Film Unit update**
Three big films in three months. *Andrew Wasley* reports on the EFU's amazing progress

regulars

06 **The big picture** Children and the fight against climate change; press release 'misrepresented' organic food study; the lowdown on geo-engineering; more dirt on coal-fired electricity; Al Gore's 'hockey-stick' vindicated

DAILY LIFE

51 **Ancient trees**
Help the Woodland Trust to map and protect Britain's ancient woodland

52 **This month**
Celebrate Apple Day, save the bees, try biodynamic food and see eco art

57 **My world: Craig Sams and Jo Fairley** A peek at the everyday world of the founders of Green & Black's chocolate

58 **Fashion changes**
Ethical clothing is making a big new statement, says *Matilda Lee*

62 **Dilemma** Eco detergent or washing at 30°C? *Laura Sevier* cuts through the greenwash at the laundry level

64 **How to...** What's the greenest way to cook? *Russell Scott* finds out

66 **Behind the label**
Get on your bike, says *Pat Thomas*, just don't forget that eco lube ain't so green

12 **News focus** *Wendy Fogarty* salutes the Declaration of Food Independence

80 **Letters** A regular forum for readers' views

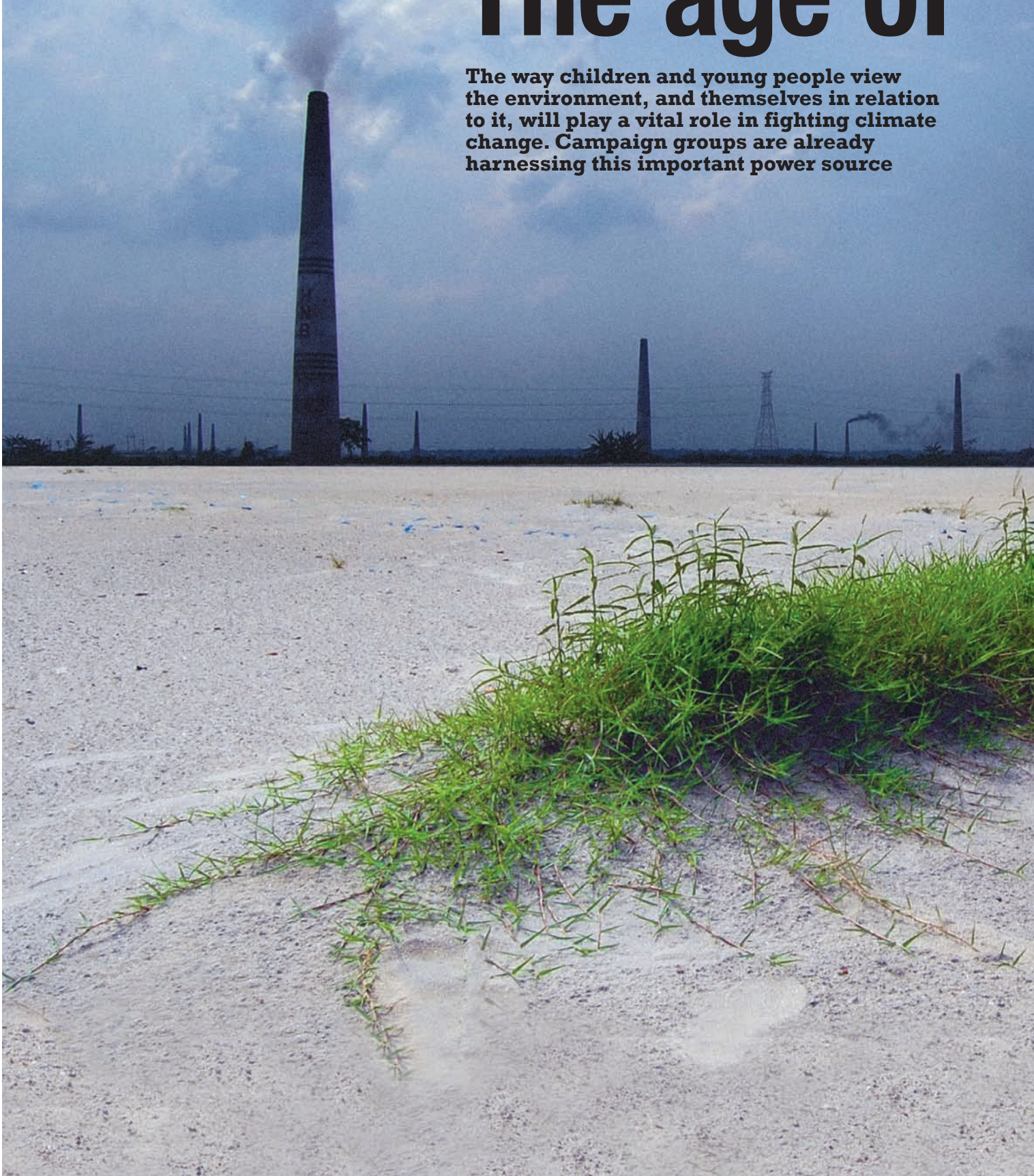
82 **Comments**
Our economic model is to blame for the current global crisis, not a population explosion, says *Asoka Bandarage*; *Joss Garman* on the latest in a long line of 'green' aviation fuels; environmentalists need to work together to succeed, says *Miguel Mendonça*; life after oil requires a return to pre-oil skills, so get into the garden, advises *Richard Heinberg*; *Jim Thomas* reports on the 'biohackers' busy remixing life-forms; are environmental pollutants causing gender ambiguity in humans, asks *Eric Francis*

90 **How to be free** *Tom Hodgkinson* on why doing nothing is the only way to progress

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The age of

The way children and young people view the environment, and themselves in relation to it, will play a vital role in fighting climate change. Campaign groups are already harnessing this important power source



innocents

This striking photo was taken by 19-year-old Zahir Hasan from Dhaka in Bangladesh as part of the recent Shoot Nations photography competition, which judged submissions from young people around the world under the title of 'Young People in a Changing Climate'.

The photograph, which shows a patch of hardy grasses in front of a brickworks in Amin Bazar, Bangladesh, was one of nine winners exhibited at the Oxo Tower on London's South Bank to celebrate International Youth Day on 12 August. See www.shootnations.org.

The photographs are not merely art, however – they are a mouthpiece for young people to make themselves heard on climate change. This is a goal being more widely pursued by a coalition of NGOs, which have formed the 'Children in a Changing Climate' initiative. A key objective of the coalition is to enforce the UN Convention on the Rights of the Child, which rules that young people have a right to be heard on issues that will affect their future, climate change in particular.

'Children are particularly vulnerable and they do rely on adults for protection and support,' reads the group's policy document. 'However, they are not passive bystanders and should never be treated as helpless victims... Provided with a suitable environment, children have proved they can play a strong role in informing policy decisions not just at the global level, but also within their own personal networks, such as schools and families, within their communities and at the national level.'

The coalition hopes once again to take a group of children to participate in the UN climate negotiations in Copenhagen in 2009.

Meanwhile in the Netherlands, a conference last summer entitled European Youth Perspectives on Consumption (YouPEC) helped introduce 160 young people to the notion of sustainable consumption.

As part of the event, the group produced a declaration on consumption to be presented to Dutch government officials, the beginning of which reads:

'This is an urgent plea by the youth of Europe for a reduction of Europe's ecological footprint. We are tremendously concerned about the consequences of our consumption patterns on a global scale... These problems are caused by clinging to the status quo and systematic prioritisation of short-term efficiency goals over and above long-term goals such as sustainability and equity.'

For more information, visit www.youpec.eu

READ ON...

- Organic study misrepresented p8
- A guide to geo-engineering p9
- Al Gore's science proved right p11

ROUNDUP

Prince Charles hits out at industrialised farming

Sir David King and Bob Watson say: prepare for 4°C of warming

Theories on decline of bee population abound

Sainsbury's drops battery-farmed chickens

GM trees could be grown on Forestry Commission land

Focus on tackling construction waste, says committee

School in Northern Ireland switches off its wi-fi network

Professor Tim Lang says get dirty in the garden to tackle food crisis

Food wastage must be halved by 2025, say experts

Do wind turbines kill bats? The jury is still out...

'Kingsnorth Six' climate activists acquitted by court

Reports paint confusing picture of domestic wind turbines

Global 'cap and share' programme could help tackle inequality too

Economic growth without good social policy doesn't aid health

See www.theecologist.org/news



THE GIRIRAJA CHICKEN

The remarkable story of India's low-tech answer to the global food crisis. Now playing at www.theecologist.org/ETV

'We were misrepresented'

The authors of a widely reported study on organic food claim that their study was misinterpreted by a journal press office

It grabbed headlines across the tabloids and broadsheets: a new study claiming that scientists had found 'no evidence' to support the notion that organic food is better for consumers than intensively farmed produce after feeding samples of both to rats.

Now, however, two of the lead researchers behind the paper have said that their work was misrepresented by the press office of the Society of Chemical Industry (SCI), in whose journal the results were published.

Dr Kirsten Brandt, one of the study's authors and a scientist with the Food Quality and Human Health Research Group at the University of Newcastle, said she was 'astonished' when she read the press release and that there was 'no evidence in the paper to support it [the SCI's claim]':

'What [the study] does show is that the differences in health of these rats cannot be explained by difference in mineral content and mineral absorption,' she said. 'This is of



course scientifically interesting, since it shows that there must be something else in the organic diet that explains the effects on health... But it does not say anything about the effect of organic diets on health.'

Brandt added that the argument used to go from the paper to the press release would be 'similar to those who would use a study showing that pure nicotine does not affect cardiovascular health to conclude that smoking is not harmful'.

The *Ecologist* contacted the SCI press office to ask why the research had been misrepresented to the media and was told: 'The SCI is impartial and independent. The press release was agreed with the lead author of the study before it was sent out.'

However, the lead author of the study, Dr Susanne Bügel, associate professor at the Department of Human Nutrition at the University of Copenhagen, said she had been contacted by the SCI to approve the

release 'in the middle of my summer holiday,' when she was 'not paying as much attention to the press release as I should have'.

She added that the release had been 'very misleading,' and that the study had certainly not shown there was no evidence for the health claims of organic foods.

'There may be differences in other compounds, for example polyphenols and vitamins, which were not measured, or in content of pesticides,' Bügel told the *Ecologist*.

Kirsten Brandt said that the press release – which concluded with a quote from the honorary secretary of the SCI's Bioresources Group, describing organic food as 'a lifestyle choice' – was all the more remarkable given that the organisation had published research the year before by the same team about the same rats, which showed clear differences in the immune status and body fat deposits between those fed organically and non-organically produced foodstuffs.

She also cautioned that the study was designed to indicate fruitful areas for further research with humans and organic diets, and was never intended to provide a direct indication of the 'healthiness' of organic food.

Flower power

Glasgow's river Clyde paid a heavy price when its natural biodiversity was wiped out thanks to an unforgiving industrial revolution.

Now, a century on, a refreshing idea to introduce solar water lilies along its banks is offering a tangible solution to increasing electricity demands.

Tethered to the river bed and plugged into existing electrical networks, the floating circular platforms are designed to cut carbon footprints as well as costs.

Photovoltaic arrays will be mounted on rafts that rotate to harness solar power, ultimately creating a portable sustainable energy source.

Engineering consultancy Mott MacDonald and architects ZM Architecture came up with the award-winning idea in a bid to supplement the city's current energy demand, which is set to increase with Glasgow's hosting of the 2014 Commonwealth Games.

'We recently completed retrofitting photovoltaic arrays to the entire roofscape of the Glasgow Sheriff Court, and this has significantly reduced the building's carbon footprint,' explained Mott MacDonald director Bryan Mackay. 'Now we hope to use the river Clyde and the lilies to produce additional electrical power for the city.'

The project will be a test-bed for other potential worldwide applications, which will provide power solutions for disaster and flood zones.

'Our early figures show that the concept is financially viable and we believe the portability of the concept is key to its ultimate success,' added Mackay. 'The lily pads present unlimited potential to use the sun's power as they are positioned on the river close to ground level, where otherwise land costs and planning constraints significantly curtail the alternatives.'

'The power outputs are sufficient to provide permanent and temporary off-grid street and building lighting,' he added.



An artist's impression of the floating solar panels, which will link directly into the city electricity grid

Solar power has the potential to supply electricity to four billion people by 2030 if properly supported, says the European Photovoltaic Industry Association

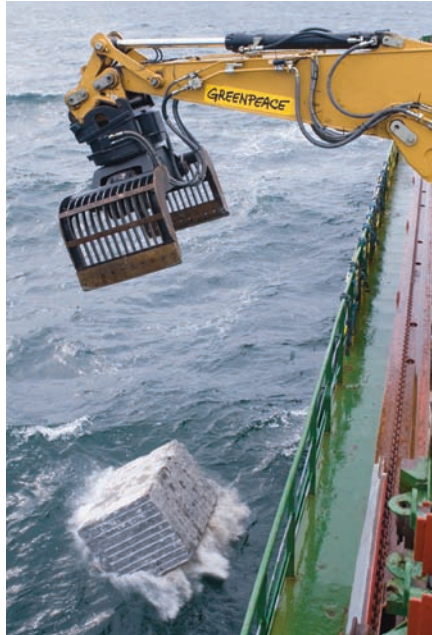
Rock bottom

Frustrated with years of trying to preserve threatened fisheries via impotent official channels, Greenpeace activists aboard their Beluga II vessel took radical action in August to stop illegal fishing in a Special Area of Conservation in the German North Sea.

The crew used a crane to dump 150 granite boulders – each weighing between two and three tonnes – on to the sea bed. The granite obstacle course will effectively prevent bottom-trawling – a highly destructive fishing technique in which metal gear is dragged along the sea floor, decimating reefs and habitats.

Greenpeace Germany oceans campaigner Dr Iris Menn said:

‘If the German government is not going to honour its commitments and give the Sylt Outer Reef the protection it so badly needs then it is up to Greenpeace to act. By placing these rocky obstacles to stop trawling in the area, we are sending a clear message – that business as usual cannot continue.’



Greenpeace activists dropped granite boulders to form an underwater shield against illegal trawling

IN BRIEF

Bottle ban holds fast

In the face of protests from the drinks industry, the Canadian city of London, Ontario, has gone ahead with a ban on the sale of bottled water at all its municipal sites.

The ban has led to a renaissance of water fountains at facilities, and a mobile water tanker to distribute water in the city's parks.

Not-so-green travel

Bad news for eco-tourists. Research by the University of California has shown that even hiking and wildlife-watching can lead to a sharp decline in populations of carnivores.

The scientists found that when people were banned from an area, native bobcats, coyotes and grey foxes were five times as abundant as in heavily visited areas. It is the first study to show an effect across a whole park, rather than single trails.

Bad birdsong

We might see not so much of a ‘silent spring’ as an ‘out-of-tune’ one. Scientists in the United States have found that wild chickadees exposed to legally permitted levels of polychlorinated biphenyls (PCBs) can't sing as well as birds that remain unexposed.

The researchers believe that because females choose to mate with the best male singers, the historic release of PCBs into the environment is directly affecting birds' life-cycles.

Don't get left behind

It's the argument most favoured by those advancing biotechnology – that consumer fears will lead to the UK being passed-by in the field of technological advance.

Now, the nanotechnology industry is trying the same tack. Kathy Groves, a project leader at Leatherhead Food International, has said that ‘nervousness’ about nanotechnology could see the UK ‘left behind’.

Some expect the nanotechnology food market to be worth \$20 billion by 2020.

All grass is not green

When is a green roof not so green? When it hasn't been designed with the local environment in mind, according to ecologists at The Lady Bird Johnson Wildflower Center, Texas.

A small team compared six different green roofs and discovered that those incorporating plant species native to the area were more effective at cooling buildings and absorbing rainwater.

FIXING THE PLANET? GEO-ENGINEERING EXPLAINED

TECHNOLOGY	INTENTION	RISKS
Sulphur dioxide spraying from aircraft	Increase concentration of sunlight-deflecting sulphur dioxide in the atmosphere	Could destroy ozone layer, contribute to acid rain and affect plant photosynthesis
Space-based mirrors	Deflect a few per cent of incoming solar radiation, slightly reducing global temperature	Very expensive, very energy-intensive to launch. Would not alleviate problems with ocean acidification
Cloud-seeding ships	Pump fine spray of salt-water into the air to encourage formation of clouds, reflecting sunlight	Untested at scale necessary; could be affected by weather or subject to hijack
Artificial trees	Suck CO ₂ out of the atmosphere and bury it underground	Relies on untested carbon storage technologies, and requires an abundant, low-carbon energy source to power the process
Iron fertilisation	Encourage the growth of marine micro-algae, which absorb CO ₂ as they grow	Effects of iron on the marine ecosystem are unknown; iron is energy-intensive to produce. Currently a world moratorium on the technique
Limestone fertilisation	Increase the ocean's ability to absorb CO ₂ by adding calcium carbonate	Limestone quarrying is highly destructive; could reduce opacity of water; cycle of marine currents could make it too slow to be effective

The other side of coal

Coal power has become synonymous among campaigners with unacceptable climate change impacts. But coal-fired electricity generation causes a host of other problems that have just been painted in startling clarity by two new reports.

Scientists from the Desert Research Institute, in Nevada, recently published an analysis of heavy metals in an ice core from the Greenland ice sheet, which shows the presence of these elements in the air from 1772 until 2003.

They had expected to find highest levels of heavy metals from ice deposited during the 1960s and 1970s, when industrial production in Europe and North America was at its peak.

Instead, the scientists found that levels of heavy metals were most concentrated just after the turn of the 20th century, when the whole economy of the Northern hemisphere was powered by coal. In fact, pollution levels in the early 1900s were 10 times higher than they had been before humanity started burning fossil fuels.

Although the data shows that heavy metals in the North Atlantic sector of the Arctic are much lower today than they have been in the past, the researchers worry that this pollution has simply been displaced to the rapidly

industrialising economies of Asia:

'Contamination of other sectors may be increasing because of the rapid coal-driven driven of Asian economies,' lead author Joe McConnell wrote in the *Proceedings of the National Academy of Sciences*. He speculates that heavy metals from coal-fired industry could be accumulating in food chains.

'Impacts on human health in the Arctic region haven't been determined,' McConnell said, 'but cleaner-burning coal technologies, or better yet, reduced reliance on coal-burning, may head off the potential problem.'

One technology much touted as offering a 'cleaner' solution to coal-burning is carbon capture and storage – the technique of removing carbon dioxide emissions before or after combustion and burying the gas in a liquefied form in exhausted oil or gas reserves. Early September saw the start-up of a German demonstration project that burns coal in the presence of pure oxygen and captures 100,000 tonnes of the resulting CO₂ each year in a depleted gas field.

But new work from scientists at Utrecht University in the Netherlands suggest that carbon capture and storage could bring its own problems.

The research, to be published in the



Two new reports have found that pollution levels in the 1990s were 10 times higher than in the 1970s

International Journal of Greenhouse Gas Control, suggests burying CO₂ could lead to an increase in other environmental pollutants, including sulphur and nitrogen compounds, which can lead to the formation of acid rain.

This increase is because stripping out CO₂ and compressing it for burial requires large amounts of energy, meaning as much as a third more coal must be burnt to produce the same amount of electricity as a conventional plant.

'Other studies mostly just look at one aspect, the carbon capture,' said study co-author Joris Koornneef. 'This is a first step in trying to quantify the [environmental] trade-offs.'

No kidding

Kids will be kids. Unfortunately, when they're in a home where there are items of furniture or toys that contain fire-retardants known as polybrominated diphenyl ethers (PBDEs), just acting like children could put them at added risk from these pervasive chemicals.

Carried out by the Environmental Working Group, a small pilot study of 20 families found that levels of PBDEs in children's blood were on average three times higher than in their mothers'. For one child, the level was six times.

'To us, this raises concerns that kids live very differently in the same environment than their parents do, and those kid-like behaviours put them at risk of contaminant exposure,' said the study's author, Sonya Lunder.

Lunder said children's tendency to place items in their mouths and their proportionally higher food intake could lead to the elevated levels of PBDEs found. Although two forms of the chemical are banned in Europe and most of the US, it is still to be found in many homes. PBDEs bioaccumulate in breast milk, fat tissues and the wider environment, and have been linked to changes in brain chemistry and toxic effects.

Are greens making the poor poorer?

Conservationists have attempted to shrug off the charge that by buying up areas of wilderness in order to preserve them, they are displacing poor people and destroying livelihoods.

Scientists from the The Earth Institute at Columbia University and the Wildlife Conservation Society, based in New York, have published a report comparing the



Those behind the scheme say the world's poorest people live in urban areas of little ecological value

distribution of the world's poorest people, measured using infant mortality figures, and the occurrence of wilderness areas, which was measured using the Human Footprint index.

The authors of the report argue that because most of the world's poorest people live in urbanised areas of little ecological value, the aims of their organisations are not in conflict with attempts to alleviate poverty.

Their work has angered campaigners for the rights of indigenous people, however.

'Security of livelihoods is still vitally important for people that do live in such areas,' Simon Counsell, director of Rainforest Foundation UK, told the *New Scientist*. 'Like it or not, conservation groups are going to have to improve the lot of local people if they want their programmes to succeed.'

He added: 'Even if relatively few poor people live in these areas, they must still take priority.'

'You cannot argue that Africa has hunger because it doesn't have GM today'

Professor Bob Watson, chief scientific adviser at the Department for Environment, Food and Rural Affairs, responding to claims by former chief scientist Sir David King that European opposition to transgenics has led to African starvation

What cost proof?

There has been a renewed call for the use of the precautionary principle in health advice on mobile phones, masts and wireless communication equipment at a conference of scientists, campaigners and industry members in London.

Irish senator Mark Daly, who chaired one of the sessions, reminded the audience that the world had to wait for 50 years for definitive proof on the health effects of smoking:

'If many years from now it is proved there is a link [between mobile phones and cancer], the consequences will cost billions of pounds and thousands of lives,' he said. 'We must err on the side of caution.'

His words were echoed by Cindy Sage, the author of a thorough but controversial review on the health effects of electromagnetic radiation, who argued that excessive requirements for scientific evidence were stalling necessary action.

'Do you stick rigidly to your guns and say we're not going to do anything – or we'll only do trivial things – before we have absolute proof?' she asked. 'I don't think that's what the public wants.'

Geoffrey Lean, environment correspondent

for the *Independent on Sunday*, was present at the conference and likened current worries over the health impacts of electromagnetic radiation to the debate over the risks of leaded petrol or the threat of climate change.

'What's the cost if [Sage's report] is wrong?' he asked. 'A small amount to the mobile phone industry. What's the cost if [the official position] is wrong? A huge public health problem.'

Theoretical papers presented at the conference, organised by the Radiation Research Trust, supported growing suspicions that low-level radiation emitted from mobile phones can lead to oxidative stress in cells, and could cause DNA damage.



Speakers expressed concerns that the mobile industry was ignoring the precautionary principle

Hockey-stick lives

Al Gore may be able to sleep a little easier at night as a result of new research which has bolstered links he made in his film *An Inconvenient Truth*.

When his film hit cinemas, the campaigner and former US vice-president and faced a barrage of criticism over his use of climate science. Opponents took particular issue with his parallels between Hurricane Katrina and global warming, and his use of the controversial 'hockey-stick' graph of global temperature to illustrate warming trends.

The idea that warming ocean temperatures might lead to increasing powerful tropical storms – the 'heat-engine' theory – was first suggested by Kerry Emanuel of the Massachusetts Institute of Technology in 2005, but his data were criticised as not reliable enough to make links between

storms and climate change. Now, three geographical scientists at Florida State University have analysed satellite data and found that the strongest tropical cyclones are getting progressively stronger, and that this is linked to ocean temperatures.

'As seas warm, the ocean has more energy that can be converted to tropical cyclone wind,' said lead author Professor James B. Elsner. 'Our results do not prove the heat-engine theory. We just show that the data are quite consistent with it.'

Meanwhile, climatologist Michael Mann, whose research led to the creation of Gore's 'hockey-stick' graph, which shows a sudden upwards leap in the world's temperature in the past century, has published a new study in the journal *Proceedings of the National Academy of Sciences*. His latest work adds a new range of past temperature indicators, including coral reef skeletons, ice cores, sea-floor sediment and rock structures, all of which point to the same conclusion: the graph is accurate and today's temperatures, at least for the Northern hemisphere, are the highest they have been for at least 1,300 years.

THIS MONTH

30 years ago

'In the search for new ways to feed the world, traditional eating habits have generally been dismissed as the prejudiced survivals of a less enlightened age.'

'Early in July 1978, the Food and Agriculture Organization (FAO) declared that irrational food prohibitions and preferences are the major stumbling blocks in its war against hunger, and it proposed a worldwide campaign to educate people to eat what they're told. Third World leaders, embarrassed by the insinuation that their eating habits are primitive, have wholeheartedly accepted FAO's plans.

'For years [nutritionists] have complained that if only humans were as rational as rats and other animals who choose their food for purely nutritional reasons [...] the world food crisis would be nearer a solution. Colin Clark, author of *Population Growth and Food Supply*, argues for instance that if we were all to adopt 'an average 1967 Japanese diet' (whatever that might be) the world could support a population of 157 billion – nearly 40 times the existing level.

'Similar claims have been made by the extreme advocates of such unfamiliar foods as comfrey [...] and soya beans. By branding others' eating habits as prejudiced, however, the experts only give the lie to their own much flaunted objectivity. [...] If the Hindu they berate for not eating his cows were to demand that they eat their cats, dogs, white mice and laboratory cockroaches, their reaction would be one of horror. For we too have our taboos.'

Extracted from 'There's more to Food than Eating', Nicholas Hildyard, The New Ecologist, Sept-Oct, 1978.



Truths self-evident

Set against the high-flown rhetoric of the White House hopefuls, a new declaration of food independence offers a down-to-earth approach to changing the world. **Wendy Fogarty reports**

The US is currently awash with political 'events' – some gaining more widespread attention than others. As US Presidential hopeful Barack Obama stepped out in front of an 80,000-strong audience at Denver's Invesco Field stadium last month to accept the Democrats' nomination to run for office, an equally hopeful, yet significantly smaller group of Americans met in San Francisco's City Hall for the launch of the Declaration for Healthy Food and Agriculture (www.fooddeclaration.org) – a 12-point petition for a new vision for food in the 21st century and the first significant attempt to frame fundamental reform of the US's food and farming policies.

Initiated by local NGO Roots of Change (www.rocfund.org) and developed by a national team of noted thinkers, producers and activists, including the author and horticulturist Michael Pollan, farmer and poet Wendell Berry and author David Imhoff, the declaration calls for a food system that is sustainable, just, nutritious and delicious:

'We, the undersigned, believe that a healthy food system is necessary to meet the urgent challenges of our time,' it read. 'Behind us stands a half-century of industrial food production, underwritten by cheap fossil fuels, abundant land and water resources, and a drive to maximize the global harvest of cheap calories. Ahead lie rising energy and food costs, a changing climate, declining water supplies, a growing population and the paradox of widespread hunger and obesity.

'These realities call for a radically different approach to food and agriculture... The quality of food, and not just its quantity, ought to guide our agriculture. The ways we grow, distribute, and prepare food should celebrate our various cultures and our shared humanity, providing not only sustenance, but justice, beauty and pleasure.'

The 12 foundation principles of the declaration identify a healthy food and agriculture policy as one that:

- Forms the foundation of secure and prosperous societies, healthy communities, and healthy people.
- Provides access to affordable, nutritious food to everyone.
- Prevents the exploitation of farmers, workers and natural resources; the domination of genomes and markets; and the

cruel treatment of animals, by any nation, corporation or individual.

- Upholds the dignity, safety and quality of life for all who work to feed us.
- Commits resources to teach children the skills and knowledge essential to food production, preparation, nutrition and enjoyment.
- Protects the finite resources of productive soils, fresh water and biological diversity.
- Strives to remove fossil fuel from every link in the food chain and replace it with renewable resources and energy.
- Originates from a biological rather than an industrial framework.
- Fosters diversity in all its relevant forms: diversity of domestic and wild species; diversity of foods, flavours and traditions; diversity of ownership.
- Requires a national dialogue concerning

'We need a Sun Food Agenda in which the farm economy is resolarised, bringing animals back on to the farm to live as close to nature as possible'

technologies used in production, and allows regions to adopt their own respective guidelines on such matters.

- Enforces transparency so that citizens know how their food is produced, where it comes from and what it contains.
- Promotes economic structures and supports programmes to nurture the development of just and sustainable regional farm and food networks.

Within days of its release, the Declaration for Healthy Food and Agriculture had received the endorsement of thousands of farmers, producers, chefs, nutritionists, educators and citizens who had gathered for Slow Food Nation (www.slowfoodnation.org), an inaugural American event seeking to galvanise and drive the growing movement for food and farming reform in the US.

While the festival atmosphere of the Slow Food Nation event – dubbed the largest-ever celebration of American Food – engaged the public, leading food and farming thinkers gathered to identify the opportunities and threats to a sustainable food system. Eric Schlosser, author of *Fast Food Nation*, noted the positive signs – the increasing production

of and growing demand for organic produce; the development of farmers' markets, CSAs and Edible School Gardens; growing respect for the skill of farmers and producers, and the increasing concern for animal welfare.

Schlosser also cautioned that 'a sustainable food system can only be achieved if the human rights of farm workers, meat packers, food preparers and restaurant industry workers (who are among the US's lowest paid and most poorly treated), are addressed'. The unpalatable reality of the agricultural labour force is one that is least acknowledged and which he believes will face the greatest resistance.

While none of the Presidential candidates will talk about food and farming – yet – Michael Pollan, author of *The Omnivore's Dilemma*, believes that key election issues such as decoupling the US economy from its dependence on oil and climate change can also only be addressed through food and farming,

It's no coincidence that the declaration was launched in California. As the nation's largest food producer, most populous state

and largest economy, it is also home to the country's local and organic food movements, which makes California best placed to develop a sustainable food system by 2030. Milestones achieved during the past two years include the state's adoption of the 2030 time-line and the creation of a state-wide leadership network working at a grassroots level to build sustainable communities.

But whether or not the state can deliver a sustainable food system by 2030 may reside in the ability of farmers to adopt one of the simplest concepts, proposed by Pollan: the 'resolarisation' of farming.

'Agriculture is the original solar technology,' he says. 'We've been eating oil for the past 30 to 40 years. All food comes from photosynthesis, which was around before oil.' Some solar initiatives are already under way in the state and it is hoped these can lead the way for the rest of the US.

'What we need,' says Pollan, 'is a Sun Food Agenda in which the farm economy is resolarised, bringing the animals back on to the farm to live as close to nature as possible – and an appetite for the production of our own food.'

When Cool Earth launched in June 2007, its aim was straightforward: to provide people with a simple and effective way of challenging climate change. Of course, reducing our energy consumption at home and on the road is an essential first step. But that isn't enough. The next priority that we must all address is the protection of the world's remaining rainforests - **Rt. Hon Frank Field MP**



Rainforests are packed full of carbon – in the trees and plants, in the soils, and even in the insects and animals. When the forests are destroyed to clear land for farming, or to cut logs, much of this carbon escapes into the atmosphere to become CO₂, the main cause of global warming.

At present, deforestation causes as many emissions as the whole of the US – or indeed the whole of China. Climate change isn't the only problem caused by deforestation. The rainforests are also the richest places in the world for wildlife. More than half of the world's species live there – from tiny humming birds and colourful orchids though to giants such as jaguars and orangutans.

If the forests continue to be destroyed, then many of these creatures will become extinct – killed off by habitat loss and by the warming climate. Deforestation also threatens forest-based people. Many tribes

Images supplied by Dilwyn Jenkins and Thomas Marent

have lived in the rainforests for millennia, relying on it for everything from food to medicines. As loggers and ranchers have moved in, large numbers of tribal people have died of diseases or been forced to abandon their ancient ways of live.

But it's not all bad news. Over the past year Cool Earth has mobilised over 20,000 people to take an active role in protecting the world's most endangered rainforests.

Each of us can sponsor a patch of rainforest to protect it from destruction. Cool Earth makes sure the forest is safe – and allows us to be sure by showing satellite photos from Google Maps on the website.

Cool Earth also supports local people, providing jobs, schools and hospitals, and making sure that the protected forest is available for activities such as rubber tapping and nut harvesting.

In just over a year, Cool Earth has protected tens of thousands of acres of the most endangered rainforest. That's a huge achievement, but we need to do more.

Cool Earth's latest project is in the rainforest in Peru. The Ashaninka tribe have lived there for thousands of years. They live in harmony with nature, hunting and gathering in the forest, and fishing in the river.

Recently, illegal loggers have tried to get access to Ashaninka lands. They offered some money – which the tribe need for essentials such as a boat to reach the hospital in medical emergencies.

The tribe called on Cool Earth for help, and the charity is providing them with an income for protecting, rather than



The Amazons western frontier in Peru

destroying, their forest. The Ashaninka are delighted with the scheme – and it's a victory against climate change and species loss, too.

Cool Earth needs more supporters to help roll out their essential work more widely.

If you sponsor a single acre of rainforest you can avoid as much as 260 tonnes of CO₂ being released into the atmosphere. That's as much as the average British family produces in ten years.

An acre costs as little as £70. A half acre is just £35.

If you care about wildlife, people and the threat of global warming, there's no better way to make a difference.



Ashaninka women and children in Cutivireni



Getting to the **meat** of the matter

Our excessive appetite for meat is taking a heavy toll on the planet, but as **Simon Fairlie** explains overleaf, the arguments used to depict omnivores as environmental super-villains are far too simplistic. And on page 20, **Richard Young** explains why grass-fed meat is an entirely different animal from its intensively reared cousin. >>



The vital statistics

Anyone whose social or working life is spent partly among environmental campaigners and partly among small-scale organic farmers has to adjust to two contrasting diets. At functions put on by the green movement, you can expect a vegetarian, or even vegan table, with a high proportion of pulses, grains, nuts, colourful vegetables, olive oil, tofu, margarine and soya milk. Often a significant proportion of the food is imported.

At a farmer's do, on the other hand, you are more likely to be served home-reared beef or lamb, home-cured ham or homemade sausages. The vegetables will be of a more local complexion, and you can expect to find cheese, butter and full-cream milk, rather than their soy-based substitutes.

Aside from any health or animal welfare considerations, the environmentalist's diet is based on the principle that grains and pulses have, on average, a lower environmental impact than meat or dairy products. It is hard to dispute this, and for six years, when I lived in the city, I too was vegetarian, partly for this reason.

The trouble is that if you leave the city and move on to a farm, the vegan or vegetarian diet can start to make less sense, especially if the farm consists mainly of the UK's most abundant crop: grass. It is not unusual for urban vegetarians to revert to meat-eating, as I did, within a year or two of moving to the country.

For some years I have been trying to work out why two groups of people, united in their opposition to industrial farming, have evolved conflicting dietary responses. The matter is a complex one because farming and land management are a complex affair. There are, however, two simplistic and exaggerated statistical clichés, disseminated by some promoters of vegetarian or vegan diets, which, while useful because they hone in on the two most crucial environmental problems associated with meat, have also muddied the picture considerably.

Ten to one

In 1813, in his *Vindication of Natural Diet*, Percy Shelley wrote: 'The quantity of nutritious vegetable matter consumed in fattening the carcase of an ox would afford 10 times the sustenance if gathered immediately from the bosom of the earth'. Shelley's observation is one of the earliest expressions of a concern that rightly worries all who

think about the ethics and economics of what we eat.

Animals convert plant protein and energy into meat protein and energy notoriously inefficiently. This means anyone who consumes large amounts of meat – and that includes most inhabitants of the USA, the UK, and other industrialised countries – may be consuming disproportionate amounts of the world's available nutrients, in a world where 800 million people do not have enough food to eat.

The feed-to-food conversion ratio of 10:1 has continued to echo down through the years. Peter Singer, in his book *Animal Liberation*, writes: 'most estimates conclude that



'The quantity of nutritious vegetable matter consumed in fattening the carcase of an ox would afford 10 times the sustenance if gathered immediately from the bosom of the earth'

Percy Shelley, *A Vindication of Natural Diet* (1813)

of meat

Is this really a
weapon of mass
destruction?

plant food yields about 10 times as much protein per acre as meat does' – and I have a collection of similar '10-to-one' quotations from a number of writers, including Jeremy Rifkin, Marvin Harris and Patrick Whitefield.

As some other writers have acknowledged, however, the 10:1 figure is an exaggeration for a number of reasons:

- A conversion ratio as inefficient as 10: 1 is only ever achieved in meat from ruminants, which mostly means beef cows; this is because their digestive systems are designed to digest high-fibre materials such as grass, not high-protein feeds such as grains. Pigs, poultry and dairy cows all convert feed into human food at a ratio of between 3:1 and 5:1.
- The feed-to-food ratio ignores other animal products, such as wool, leather, industrial products, nutrient accumulation through manure and animal traction – the last two being a matter of such importance to many farmers in the developing world that meat for them is a mere byproduct.
- It is argued by some nutritionists, and sensed by many meat-eaters, that animal protein (or a proportion in the diet) is of more nutritional value than pure vegetable protein.
- Organic crops, grown without animal manure, require on average approximately 33 per cent more land (to supply

green manure) than crops grown with animal manure.

These factors probably serve to reduce the average feed-to-food conversion ratio of meat and dairy to 3:1 or so. This is still inefficient, but doesn't account for the most important element of all: a considerable amount of what is or could be fed to livestock can't be eaten by humans anyway.

How large is this amount? According to University of California food analyst J G Fadel, the processing byproducts of seven industries worldwide (vegetable oil, sugar beet, grain milling, distilling, citrus fruits, almonds and cotton) in 1993 amounted to about a quarter of a billion tonnes of dry matter. If fed to animals it would be sufficient to support the production of 435 million metric tonnes of milk – more than the entire world's milk supply at the time, or approximately a third of all the nutrients provided by livestock in the world (according to 1997 figures).

Admittedly, some 15 per cent of the above figure comes from the meal left over after making soya bean oil – which is more co-product than byproduct – but Fadel also calculated that the crop residues from wheat, rice, barley, maize and sugar cane (bagasse) totalled a further three-quarters of a billion tonnes of dry matter. Mainly fibrous straws, these are

often not fed to animals when better food is available, but in poorer countries they often are, and worldwide they provide enough energy to support nearly 60 per cent of the world's milk supply, and enough protein to supply 27 per cent.

On top of that is all the consumer food waste. In the US, according to figures from the US Department of Agriculture, consumers throw away 44 per cent of available food, while in the UK, Lord Haskins estimates that 16 million tonnes of food are thrown out every year from homes, restaurants, shops, schools and the like. Much of this waste used to be given to pigs, and still would be were it not for the EU's hysterical ban on pigswill in the aftermath of the 2001 outbreak of foot-and-mouth in the UK. Observed conversion ratios for swill into meat suggest feeding this 16 million tonnes to pigs would provide at least 660,000 tonnes of pork, about 45 per cent of all the pork consumed in the UK.

Finally, there is grass. An estimated 25 per cent of the world's land is classified as rangeland or permanent pasture unsuitable for growing crops. In 1997, when the UN Food and Agriculture Organization (FAO) published a comprehensive analysis of global livestock figures, farming systems based solely on grazing produced approximately 9 per cent of the world's meat and 8 per cent of the world's milk. In addition, there is a considerable amount of grazing of non-arable lands on the mixed farms that, at the time, produced 54 per cent of the world's meat and 92 per cent of its milk.

I have been unable to find an up-to-date figure for the total amount of meat, dairy, leather, pet food, traction and other commodities provided by livestock fed on food we cannot eat or land we cannot cultivate. According to Dutch food analyst Sanderine Nonhebel, writing in 2003, 70 per cent of livestock feed in the Netherlands consists of residues, though in other countries the figure is lower. In 1979, David and Marcia Pimentel cited figures showing that 60 per cent of the animal protein consumed by humans in meat and dairy products was derived from grasses and forages that can't be used by humans. In 1997, the FAO estimated that, worldwide, animals consumed 74 million tonnes of human edible protein and provided 54 million tonnes. That's an overall conversion ratio of 1.4:1 – a far cry from the proverbial 10:1.

Taken together all the above figures suggest that today somewhere between a third and two-thirds of all the world's meat, dairy products and leather could be provided without using any arable land that could otherwise be used to grow human food crops.

Eighteen per cent

In recent years, the livestock industry has come in for criticism on another score: meat and dairy produce are responsible for a significant proportion of global greenhouse gas emissions. The concerned British consumer can be forgiven for being confused by two apparently contradictory ranges of figures.

On the one hand, campaigners such as Jonathon Porritt and Caroline Lucas have claimed that livestock are responsible for 18 per cent of global greenhouse gas emissions – 'more than the whole of the transport sector', according to a campaign leaflet published by Compassion in World Farming and undersigned by Porritt. This slant comes from a 2006 report entitled 'Livestock's Long Shadow', published by the FAO, whose widely publicised press release announced that livestock's 18 per cent of global greenhouse gas emissions was 'a bigger share than that of transport'.

On the other hand, almost all other estimates put the

figure for livestock emissions far lower. The World Resources Institute assigns just 5.1 per cent of global greenhouse gas emissions to 'livestock and manure', whereas it holds transport responsible for 13.8 per cent of emissions, a figure that only covers fuel and does not take into account road-building, vehicle manufacture and other transport infrastructure. The Government reports that direct emissions from livestock represent just 4.5 per cent of total UK emissions, while Tara Garnett of the Food Climate Research Network estimates them at 6 per cent or so – 8 per cent if we include food imports. These lower estimates are in line with similar figures for other industrialised countries.

It is worth examining how, and also perhaps why, the FAO arrives at figures for livestock emissions that are so much higher than anyone else's. The main way it does this is to include CO₂ emissions for Amazon deforestation. These are a matter of huge concern, but to attribute them solely to the global meat industry distorts the picture in several ways: first, because approximately 99 per cent of meat and dairy products are not rainforest beef; second, because it is debatable to what extent cattle ranching is the driving force

GETTY IMAGES

HIGH-ENERGY EATING

Everything we eat has an ecological footprint, but few food products have been subjected to high-quality life cycle analyses that quantify all the energy inputs from farm to fork. Many of the analyses that do exist are inadequate, failing to take account of things like logistics, packaging, refrigeration, cooking and processing. When all these factors are taken into account, the results can challenge some close-held assumptions about the balance between omnivorous and vegetarian diets.

In 2002, when Swedish researchers took a comprehensive look at the energy inputs of 150 different foods, meat – especially from ruminants – had predictably large inputs. But vegetarian food flown in by plane, vegetables that are deep-frozen and those grown in heated greenhouses were all less environmentally friendly than locally produced organic meat.

The study found that grains, pasta and fresh, minimally processed fruit and vegetables generally required the lowest energy inputs per kg. Surprisingly, the most energy-intensive foods included some mainstays of vegetarian eating, and consisted of (in approximate descending order):

1. **Shrimp, without shells**
2. **Tropical fruits, fresh, flown in**
3. **Cod, fresh, cooked**
4. **Salmon, farmed**
5. **Beef, fresh and frozen**
6. **Tomatoes, grown in greenhouses**
7. **Cheese, all types**
8. **French fries, single portion**
9. **Milk powder**
10. **Tuna, canned**
11. **Chocolate**
12. **Lamb, chicken and pork, most types**
13. **Butter**
14. **Baked cereals**
15. **Apples, commercially dried**
16. **Mackerel, fresh, cooked**
17. **Herbs and spices, commercially dried**
18. **Sausage**
19. **Potatoes, baked**
20. **Strawberries, fresh, flown in from Middle East**

Pat Thomas

behind deforestation; and third, because emissions from deforestation reflect expansion of the industry, not production. If Amazon deforestation were halted tomorrow, we could still be getting beef from areas already cleared, without any further emissions. If you take rainforest beef out of the equation, the FAO's figure drops from 18 per cent to 13.5 per cent of global emissions, or 12 per cent if you discount Amazon soya as well.

Another fifth of the FAO's 18 per cent is derived from nitrous oxide emissions emanating from manure when applied to soils – whereas the World Resources Institute assigns these emissions to 'agricultural soils', not to livestock. At first sight, the FAO might seem to be correct in attributing these emissions to livestock, but in fact it introduces a distortion. The FAO's figures only take into account emissions from nitrogen fertiliser applied to animal feed crops, yet include emissions from manure when applied both to animal feed and human food crops. Since, in the absence of a livestock industry, any manure formerly applied to food crops would have to be replaced by synthetic nitrogen or green manures, with broadly equivalent rates of nitrogen

loss in the soil, these emissions are the consequence not of livestock manure, but of our need for food crops.

Elsewhere I have described other ways in which the FAO authors puffed up the emissions from livestock, but they do not put forward their elevated figure as a reason for reducing meat-eating. Far from it: they advocate a doubling of meat consumption by 2050. Their line of argument is as follows:

The bulk of the emissions from rainforest beef, manure use and other factors that the FAO has introduced to swell the figures can be blamed on extensive farmers – namely peasants, graziers and organic farmers. This enables the FAO to conclude that 'by far the largest share of emissions come from more extensive systems'. It is then a simple step to conclude 'intensification and perhaps industrialisation of livestock is the inevitable long-term outcome'. Intensification includes 'a relative expansion of concentrate-based production systems, in particular chicken and other poultry'.

This is not a view that the FAO has suddenly come to as a result of its investigation into greenhouse gas emissions; rather its conclusions about these emissions conveniently reflect an ideology that FAO economists have held for many years, and which the *Ecologist* vigorously opposed in its special issue on the FAO in 1989. This is Henning Steinfeld, the main author of 'Livestock's Long Shadow', writing in 1998, before the FAO began to treat global warming seriously: 'We cannot afford the common nostalgic desire to maintain or revive mixed farming systems with closed nutrient and energy cycles... To avoid overuse of immediate natural resources, mixed farmers and pastoral people alike need to substitute them with external inputs' [meaning fertilisers, feeds and pesticides]. The trend of further intensification and specialisation is inescapable.'

Of course, this trend isn't inescapable – humanity has the power to make choices – but the authors of 'Livestock's Long Shadow' are no doubt amused that a report advocating factory farming should find favour with so many environmentalists and vegans. And the transport lobby, which the Government states is responsible for 30 per cent of all UK greenhouse gas emissions, must be delighted that so many people are now being persuaded that meat-eating is worse for the environment than driving a car.

Default livestock farming

One paragraph in 'Livestock's Long Shadow' is particularly helpful in pinpointing the difference between traditional livestock husbandry and the intensive stock-rearing the FAO promotes: 'Livestock are moving from a "default land user strategy" (i.e. as the only way to harness biomass from marginal lands, residues and interstitial areas) to an "active land user strategy" (i.e. competing with other sectors for the establishment of feedcrops, intensive pastures and production units). This process leads to efficiency gains in the use of resources.'

Quite how growing corn on grade-one arable land and feeding it to livestock at a conversion ratio of 3:1, 5:1 or 8:1 can be construed as an 'efficiency gain' is a mystery that the authors do not unveil. To those of us whose capacity for logic has not been twisted by excessive enthusiasm for free-market economics, it is abundantly clear that default livestock farming – keeping animals only to graze marginal land and mop up residues, wastes and surpluses – must be more efficient than intensive farming because no human food is fed to animals; and more efficient than stockless farming in that it keeps in the food chain wastes and residues that non-



meat-eaters can only burn for energy or return to the soil.

How then would a strict default livestock land-use strategy perform in respect of global warming? We have already established that between a third and two-thirds of our current global production of meat, dairy and so on could be provided without using arable land that could otherwise be used to grow human food crops. This suggests, even by the FAO's own methodology, that the 18 per cent might be roughly halved. Reduced demand for soya protein (though admittedly not for soya oil) might ease pressure upon the Amazon and make it easier to stop the deforestation.

Nitrous oxide emissions would be disproportionately reduced because all emissions related to the production of dedicated animal feed would be eliminated, while – as the authors of 'Livestock's Long Shadow' admit – 'inefficiency is irrelevant in broader terms as long as the animals are totally grass-fed, or raised primarily on crop and food-processing residues'.

The only element of the FAO's 18 per cent that would survive to a significant degree in a default livestock scenario would be methane emissions, mainly from ruminants' stomachs, which might remain equivalent to perhaps 4 per cent of the world's greenhouse gas emissions. These could partially be eliminated if we got rid of dairy animals and sheep, and reared only pigs, poultry and fish.

This is not an attractive option, however, since ruminants are by far the most efficient way we have of turning grass, straw, leaves and other human-indigestible fibres into human food, and methane emissions are arguably a worthwhile price to pay for this invaluable service. Many farmers in the developing world are dependent upon grass-fed ruminants for their traction, manure, fuel and milk, while the world's largest dairy industry, in India, is nourished largely through crop residues, wastes and wayside roughage. Getting rid of these cows in order to reduce livestock methane emissions would result in widespread hunger. On the other hand, getting rid of the US feedlot system, in which beef steers really are fattened on a grain-based diet at a conversion rate of close to 10:1, would be a benefit to everyone.

A return to a default livestock economy might result in something in the order of a 50 per cent reduction in meat and dairy products, and a proportionately larger reduction in greenhouse gas emissions from livestock. Moreover, the majority of livestock reductions would be in industrialised countries, where obesity, not hunger, is the problem, and less in developing nations, where many livestock are already fed on a default basis. A move to a wholly vegan diet (if it could be introduced and enforced), however, would have severe repercussions on the millions of rural and urban poor who supplement their diets with milk or meat derived from animals fed on wastes, residues and unwanted biomass.

I don't advocate default livestock farming as a strict ideology to which all humanity should conform. There are a number of circumstances in which we might find it necessary or sensible to feed grain to animals – to act as a 'feed buffer', for example, a reserve of grain to fall back on in the event of a poor global harvest. But default livestock farming does present a clearly defined and easily understandable middle road that steers a course between the rigours of total veganism and the greed, pollution, dependence upon fossil fuels and contempt for animal welfare that characterises intensive, factory farming.

Simon Fairlie is editor of *The Land* magazine

Not all meat is created equal

I must declare an interest. I am a farmer. I make a profit (though recently often a loss) from breeding cattle and selling beef. Like most people, though, I have significantly reduced my consumption of red meat in recent years, just to be on the safe side. I assumed that evidence of the health-damaging effects of red meat consumption was overwhelming, but it is becoming clear that there are big differences in the health-giving or health-taking properties of meat depending on how it is produced.

Cancer and cardiovascular disease account for almost two-thirds of premature deaths in the UK. The powerful health messages linking meat consumption to these diseases have been with us for so long now, and in so many forms, that for many people the association has become almost incontrovertible.

In November last year, the World Cancer Research Fund (WCRF) produced a major report on diet and cancer. Reputed to have cost £4.5 million it was the most comprehensive analysis ever of international scientific research into possible links between the food we eat and the development of cancer. Despite this, it was only able to draw a limited number of clear conclusions. One was to 'limit the consumption of red meats (such as beef, pork and lamb)' because of limited evidence that high consumption of red meat could be a factor in the development of bowel cancer.

Based on the criteria set out in the report, the evidence against red meat was not actually strong enough to make this recommendation, but the WCRF made an exception 'in part because of the relation with cardiovascular disease'. In contrast, the report recommended that 'people who eat fresh foods are advised to prefer poultry', because the evidence linking poultry with cancer 'is not substantial'.

The WCRF recommendation to limit red meat was immediately incorporated into Department of Health guidelines and has also found its way into a recent Cabinet Office report on food policy. It reinforces the message on cardiovascular (CVD) disease, though it acknowledges that



the case it set out 10 years ago in a report linking high fat consumption to cancer is no longer tenable.

There is nevertheless something counterintuitive about the link between meat consumption and disease. The UK is typical of many developed countries, in that farmers have significantly reduced the level of fat in red meat over the past 20 years (see box page 22). We also eat half as much beef and 10 times as much chicken as we did in 1950. During this time, however, levels of cancer have increased, and what decrease there has been in the level of heart disease is mainly attributed to a reduction in smoking.

Governments and their advisers inevitably look for simple messages they feel consumers will be able to understand. The science of what we eat and how it affects our health, however, is invariably complex. We tend to trust that the scientists who have been through the data so painstakingly on our behalf understand it accurately in ways we could never hope to do.

But can we really trust that they have got it right, or could it be that the messages have been simplified so much that they have lost precision, or even become inaccurate?

One of the most notable omissions from both the recommendations on red meat and heart disease, and red meat and cancer, is that they give no consideration to different production methods.

As far as these reports are concerned, red meat is red meat whether it comes from a Scottish hillside or a dusty US

feedlot in Kansas; whether the animal eats a diet of grass and wild herbs or predominantly cereals and maize; whether the animal walks several miles a day in search of a varied diet, or is confined for its entire life in a concrete space that gives it barely room to lie down and stand up; whether or not the land is forced with artificial fertilisers and synthetic pesticides, and the animals are routinely given antibiotics and wormers, or reared more naturally using organic methods. The differences, however, may be crucial.

A matter of fat

This is especially true when it comes to the issue of fats. Oversimplification of the fat/cancer/heart disease link fails to recognise that most foods contain some saturated fat, that there are many different types of fat and most of them have beneficial properties in appropriate amounts. In excess, or when out of balance with each other, however, some of them can cause problems.

Stearic acid, for example, is a saturated fatty acid and a significant component of beef fat. In the body it is converted

'Recommendations on red meat and heart disease, and red meat and cancer, give no consideration to different production methods'

to the monounsaturated oleic acid, the principal fat in olive oil. Neither stearic acid nor oleic acid, which together make up more than 50 per cent of beef fat, raise cholesterol levels. Both the naturally occurring trans fats in meats – vaccenic acid and conjugated linoleic acid (CLA) – have been shown either to be harmless, in the case of the former, or positively beneficial in protecting against both cancer and heart disease, in the case of the latter.

Lauric and myristic acids are known to increase cholesterol, but are only found in small quantities (1-2 per cent) in red meat – about the same level as in poultry meat. Likewise, and despite some important properties, palmitic acid can raise bad cholesterol levels and is found in approximately 25 per cent of beef fat – but again this is roughly the same proportion as in pork and chicken fat.

When referring to the harmful effects of saturated fats, there is sometimes still a tendency to lump trans fats with saturated fats. This dates from the 1984 COMA (Committee on the Medical Aspects of Food Policy) report, which falsely concluded that the function of the trans fatty acids was the same as that of saturated fatty acids.

But according to Dr Mary Enig, author of *Know Your Fats*, we have got it entirely wrong about saturated fats and heart disease. She claims that early concerns about the dangers of hydrogenated (trans) fats voiced in the 1950s were deflected by the edible oil industry, which skilfully 'shifted the emphasis to saturated fat and started the unwarranted attack on meat and dairy fats' to protect its own interests.

According to Enig, an unbiased analysis of the evidence, which few scientists have undertaken, shows the association between animal fats and heart disease to be completely false. She points out that prior to 1920, when diets contained

'The FSA now admits manmade trans fats are worse for the health than the saturated animal fats they were designed to replace'

significantly higher levels of fats from red-meat animals than today, CVD was almost unknown. Since then, animal fat consumption in the US has steadily declined, while the consumption of vegetable fats – particularly the relatively health-damaging omega-6 fats in relation to the health-promoting omega-3s – has increased approximately fourfold.

Getting back to grass roots

In contrast, even the Food Standards Agency now admits that the manmade trans fats that have constituted such a large part of the average diet for several decades are worse for health than the saturated animal fats they were designed to replace.

Evidence has been accumulating for some time that the method of production of all farm animals can make a big difference to the composition and balance of animal fats. Such differences could influence whether the meat is beneficial or harmful to human health.

More than a dozen studies have now found that grass-fed cattle have a desirable higher ratio of the omega-3 to omega-6 essential fatty acids, higher levels of CLA than conventional meats, as well as lower overall levels of fat than grain-fed animals. Three studies published between 1998 and 2001 in the *Journal of Animal Science* found that steers at grass or receiving silage had respectively 45 per cent, 200 per cent and 500 per cent more of a beneficial type of CLA (c9, t11 CLA) than feedlot cattle on cereal diets.

One large and very recent study published in the same journal has confirmed the findings of these and other smaller studies. Sirloin steaks and minced beef from grass-fed beef cattle had lower total fat levels than those from grain-fed cattle, almost four times as much omega-3 and slightly less omega-6 than grain-fed animals, giving a vastly superior omega-3 to omega-6 ratio. The grass-fed beef also had almost twice the level of CLA.

It has been shown that the right ratio of omega-6 to omega-3 fatty acids in the diet can protect against heart disease. It is not clear whether the relatively small amounts of essential fatty acids in meat are sufficient to influence cardiovascular health, but it is notable that those found in grass-fed animals are in the ideal proportion, while those found in grain-fed animals are not.

These beneficial fatty acids are mostly associated with green leafy plants, so it isn't surprising that animals eating fresh or conserved green food have higher

levels than those eating predominantly cereals. Even higher levels are found in clover than in grass, so it is possible that animals reared on a clover-grass mixture, such as organic animals, will have slightly higher levels than other grass-fed animals, where the nitrogen fertility comes from fertilisers rather than legumes. Studies have also found

HOW MUCH MEAT SHOULD WE EAT?

Is there an optimal, sustainable amount of meat we should be eating? Nutritionists may vary in their opinions, but data based on land use sheds some useful light on the question. In 2007, researchers at Cornell University studied 42 diets with the same number of calories and a core of locally produced grains, fruit, vegetable and dairy products, and varying amounts of meat. At the extreme ends of the spectrum there were marked differences. A person following a low-fat vegetarian diet, for instance, needed only 0.44 acres per year to produce their food, compared with 2.11 acres for a person on a high-fat diet with a lot of meat. Nevertheless, the strict vegetarian diet was not the most efficient in terms of land use.

The reason for this is that fruits, vegetables and grains require high-quality cropland, while meat products can be produced on lower-quality but more widely available pastureland. Adding a small amount of protein from meat and eggs to the diet (equivalent of 2oz daily, a little less than half the average intake) was actually the most land-efficient diet.

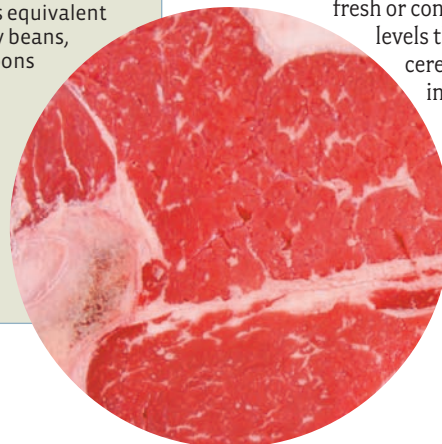
Most of us eat more meat and other protein-rich foods than we need. If

you are used to eating lots of meat it can be difficult to envisage what the amount above looks like. There are some useful mnemonics that can help, however.

For instance, a 3-4oz portion of meat is approximately the size of a deck of cards. A 1oz portion is approximately the size of a small matchbox.

Using the Cornell researchers' guidelines, we could still be eating three portions of (preferably organic) meat the size of a deck of cards each week and reducing pollution from meat production, as well as improving our health and the sustainability of our food supply enormously. The rest of our protein requirements are easily met from other sources: 1oz of meat, poultry or fish is equivalent to ¼ cup of cooked dry beans, one egg, two tablespoons of peanut butter or ½oz of nuts or seeds. Dairy products are also good sources of protein and other essential nutrients (though of course these are also high-energy input foods).

Pat Thomas



higher levels of antioxidants – such as beta-carotene, vitamin E and zinc, which is important for the immune system – in meat from grass-fed cattle.

There have only been a few studies on the relative levels of different fats in sheep and pigs from different production systems. One recent study, in the journal *Meat Science*, compared organic and conventionally produced lamb, and found that while overall differences were small (all animals being reared on grass), organic lamb tasted better and had 2 per cent or so more CLA and 30 per cent more omega-3 fatty acid. The study found that all the chops tested had a similar overall fat content of 14 per cent, approximately half that found in a similar study 10 years earlier.

One private, unpublished and incomplete study of pigs reared organically compared with those reared intensively found some evidence of higher levels of omega-3 fatty acids in organic pigs, before the high cost of testing caused the project to be abandoned.

As for chickens, researchers from the London Metropolitan University have shown that a typical supermarket chicken today contains 2.7 times as much fat as in 1970, and 30 per cent less protein. Just 16 per cent of a chicken is now protein, compared with almost 25 per cent 35 years ago. As a result, an average serving of chicken contains almost 50 per cent more calories than it used to. Organic chicken has slightly more protein and 25 per cent less fat, but is still a great deal fatter and less meaty than chickens in the past.

The study also found that the amount of the important omega-3 fatty acid DHA in supermarket chicken fell by 85 per cent between 1980 and 2004, while omega-6 increased by 260 per cent. Other studies have found that free-range chickens have a better fatty acid composition than birds reared indoors and are significantly less fat. Organic chicken has also been shown to contain higher overall levels of polyunsaturates, including 38 per cent more omega-3.

Where is now?

So where does this leave us? It is clear that we eat too much meat in developed countries, and that if developing countries continue down the same path the additional demand for grain to feed ever more intensively reared animals is likely to create a situation where the environment and people in the very poorest countries suffer even more than today. However, it is also important to note that the relationship between fat and red meat consumption in relation to heart disease and cancer is very much more complex than we have been told, that much of the past advice we have been given in these areas was wrong and that the dietary changes we have made have worsened, rather than improved, the situation. As such, we should look to reducing meat consumption overall, and not focus solely on red meat.

All over the UK, farmers are cutting back on numbers of cattle and sheep because they can no longer make a living, and in some areas grassland lies abandoned. The problem isn't so much farmgate prices as the fact the Government is making life difficult in a range of ways for producers of red meat. I believe this is because it has accepted the arguments against red meat without itself evaluating the evidence from its advisers. This is something it rarely does. In contrast, while pig and poultry numbers have also fallen in the UK, we are eating more of these two intensively produced meats than ever before – we are simply importing more meat from



RISING CONSUMPTION

Over the past 50 years there has been a dramatic global rise in meat consumption, largely due to an increasing population. Between 1961 and 2007, the world population increased by a factor of 2.2, but meat consumption quadrupled and poultry consumption increased tenfold.

This strong upward trend hides marked variations between developed and developing countries, however, and between different types of meat. Between 1974 and 1997, for example, meat consumption in developed countries increased from 77 to 98 million tonnes (27 per cent), roughly in line with the population increase, while in developing countries it increased from 32 to 111 million tonnes (247 per cent). Despite this, per capita levels are still a long way below those in most Western countries. In China, average annual chicken consumption has doubled in a decade to 10kg per head, but in the UK it is 32kg and in the US 54kg.

In developed countries the main change over this period has been in the type of meat consumed, with a dramatic increase in white meat, particularly chicken, and a fall in red meat, notably beef. As a result, we in the UK now consume almost twice as much chicken as beef, whereas in 1950 we consumed more than 20 times more beef than chicken.

The BSE crisis in the UK also reduced demand for beef, though a similar downturn in demand also occurred at about the same time in many developed countries where BSE was not a problem. In South Africa, for example, a country where BSE has never been identified, red meat consumption declined from 44kg in 1970 to 19kg in 2000, while poultry consumption increased from 6kg to 20kg per person over the same period. This has been attributed in large part to health messages about the risks associated with eating red meat.

'Annual chicken consumption has doubled to 10kg per head in China. In the US it is 54kg'

countries that can produce them at rock-bottom prices, often because welfare standards are lower.

Given the enormous importance of diet to our health and of grazing animals to the environment, these issues are long overdue for a more enlightened and independent review than they have received so far.

Meat will continue to play a major part in most people's diet. Grazing animals play a crucial role in maintaining the world's natural and semi-natural grasslands, and especially in preserving some of the UK's most cherished landscapes and wildlife-rich habitats. We need to eat less meat in the developed world, and to encourage developing countries not to follow the US route to a diet of grossly excessive meat consumption. This is crucial to reduce diet-related ill-health, and to reduce the huge energy and greenhouse gas emissions associated with intensive meat production, to say nothing of the cruelty, and the abuse of medicines vital to human health. Simplistic 'don't eat meat' or 'red meat bad' messages risk doing more harm than good, however. There is mounting evidence that a more sensible and environmentally responsible health message for UK consumers would be to encourage people to eat less meat, to eat grass-fed beef and sheep, organic if possible, and organic chicken and pork.

Richard Young is a policy advisor to the Soil Association

Don't believe

The current economic downturn is hard, but it's also filled with opportunities to remake the world in a more sustainable way. Just don't trust everything you read in the papers, says **Stephen Hale**

The prospect of a global recession has given the opponents of environmental action a new lease of life. They claim, wrongly, that the downturn in the economy is a reason for politicians, business and the public to abandon the environment.

In fact, the downturn is a perfect opportunity for a radical transformation of energy, transport, housing and the economy.

The case for such a transformation has been building in recent years. Climate change and, to a lesser extent, other environmental issues, finally reached the top of the agenda in 2005, and they've been there ever since. Now it seems the media is tiring of it and wants to write a new story about the end of the 'environment bubble' – and the economic downturn has given it an excuse. Tellingly, the *Guardian's* climate change summit in July was titled 'Fighting climate change fatigue: how to keep stakeholders engaged'.

The media is currently peddling three dangerous myths. The first is that the downturn makes green choices unaffordable – but this downturn is partly driven by high oil (and gas) prices that now make some green alternatives such as energy efficiency, public transport and fuel efficiency much more attractive to drivers, home owners and businesses. However, without new incentives from government to take these actions, people are unlikely to make the change.

The second myth suggests that since the recession of the early 1990s led to a collapse in concern for the environment, the same must therefore be true today. That recession did squeeze the environmental agenda, but it was people's inability to act, not their concern for the environment, that stalled it.

Today, public understanding, concern and ability to act is very different. Car clubs, recycling rates, Transition Towns, farmers' markets and Freecycle are evidence from the real world that 2008 is not 1990.

Myth number three is that the public sees environmental issues as a luxury to be put aside in tough economic times. The evidence shows us otherwise. A poll for ICM in June found that, when asked whether, given global economic problems, tackling the environment or the economy should be the Government's priority, 52 per cent said the environment and 44 per cent said the economy.

Corporate commitment is also far greater than in the 1990s (see box page 26). Company-facing companies such as Marks & Spencer and Tesco will doubtless trim when times are hard, but continued pressure from consumers and an increased framework of government regulation will help limit the extent to which they will abandon their green commitments in a downturn.

Oil prices are also stimulating energy efficiency in the private sector, and a rapid increase in investment in renewable energy and other low-carbon options. The oil price hike means energy investments that offer

security of supply are seen as a safe haven. Europa says global investment in sustainable energy increased by 43 per cent in 2007. The Government is now talking of a £100 billion private sector investment in renewable energy, while a recent Climate Group study noted that China invested £6 billion in renewables during 2007, second only to Germany.

Real change in the real world

Never mind predictions, how is the downturn playing out in reality? The signs are that high oil prices are changing people's behaviour.

At the time of writing, a 50-litre tank of petrol costs £59, a big increase from £48 this time last year. The AA estimates a two-car family would need to pay an extra £46.50 a month for the same amount of fuel. These prices are having an impact that transport policy has so far failed to make: two-thirds of motorists are cutting back on their journeys.

In addition, more people are shopping locally. Another recent survey by Populus showed that 29 per cent of motorists had cut back on trips to out-of-town retail parks and a third had even stopped driving to local shops, preferring to walk, cycle or take the bus.

As fuel prices rise, even North Americans are rethinking their habits. They drove 11 billion fewer miles in March 2008 than in March 2007 – a 4.3 per cent drop, and the first downward trend in 30 years. Public transport is growing as a result. There were 10.3 billion trips on US public transportation in 2007, the highest level in 50 years, an increase of 2.1 per cent. The hybrid market is booming, while SUV sales are plummeting. By 2015, hybrids alone are expected to make up one in 10 vehicles on US roads. The big US car manufacturers are struggling, and companies such as Ford are shifting investments into smaller vehicles.

Our holiday choices are changing, too. One sure sign is that budget airlines are suffering.

'In fact, the downturn is a perfect opportunity for a radical transformation of energy, transport, housing and the economy'

the hype



Ryanair's profits recently tumbled 85 per cent, EasyJet is cutting its capacity at Stansted by 12 per cent and Zoom has gone into receivership. Meanwhile, domestic holiday bookings at lastminute.com are up 12 per cent on last year.

Action now that helps now

These are enforced changes in behaviour, and they may not be seen all that positively by many of the people making them. It is for that reason that we need to create a society in which these and the many other changes we need to make are easier and more attractive to people. To do this, and to turn these trends into something far more positive and sustainable in every sense of the word, we desperately need strong political leadership.

Climate change makes this imperative, of course, but the threat of peak oil is another powerful driver. A recent *New Scientist* survey

of oil industry experts found that most believe global oil supplies will peak by 2010. A 2005 report by the US Department of Energy argued that unless the world begins a crash programme of replacements 10 or 20 years before oil peaks, a crisis 'unlike any yet faced by modern industrial society' is unavoidable.

We're in the crash programme zone right now, and that means we need radical action from government that helps people and businesses make these changes.

The high and rising cost of fuel and energy make efficiency a critical part of a politically sustainable strategy, and action here is one of the few areas in which governments can actually help families cope with rising prices. High oil price should be the springboard for an efficiency revolution at home, at work and in all forms of transport, and government should use its immense power to make this happen.

Many people can take the actions that make sense in a downturn, but it is the poor, who suffer most from high prices and rising bills, who are least able to act. A Labour government ought to be helping them with this, and it has belatedly got at least part of this message. While we can expect a push on energy efficiency from the Prime Minister after the summer break to help with winter fuel bills, this is likely to be piecemeal.

As the IPPR/British Gas initiative 'Green Streets' brilliantly illustrates, the UK has the potential to save more than £4.5 billion on energy bills, cutting energy use by 30 per cent and CO₂ emissions by 20 per cent. Spending an additional £500 million per year on 10,000 neighbourhood energy advisers would produce potential savings of £4.6 billion. The Government ought to be adopting the IPPR's proposals now, as well as encouraging new

Greening the corporate world

It's not just individuals who can see the economic advantages of going green. The scales are also falling from the eyes of big business, says Tensie Whelan

Just as the trend towards global companies greening their supply chains speeds up and scales up, the global economy slows down. So we have to wonder: will being in the economic doldrums take the wind from the sails of environmental progress?

Little more than half a year ago, Wal-Mart CEO Lee Scott unveiled his 'Sustainability 360' initiative to adopt green and ethical sourcing, reduce resource consumption, use 100 per cent renewable energy, produce zero waste and sell green products on a massive scale. Projections for positive environmental impacts were staggering, and Scott was confident Wal-Mart would benefit financially, 'doing well while doing good', a dictum more widely embraced in Europe than in the US.

Since then, recession has stalked both Europe and the US, growth has slowed in China and India, and the prima facie business case for new investment in sustainability has become harder to make. It has even become fashionable in some circles to predict the demise of the business greening trend.

Those rumours are likely exaggerated. There is not yet much hard data on how companies' investments in sustainability are paying off, but there are plenty of studies and examples of global leaders indicating that greening trends remain strong.

A recent Aberdeen Group survey of 400 companies noted globalisation, increasing compliance requirements and supply cost pressures were driving companies toward improved sustainability and CSR programmes. The desire to be viewed as a thought-leader

for sustainability, the rising cost of energy, supplies, material and transport, the search for competitive advantages and product differentiators, and growing pressure from customers were the top reasons why these companies invest in sustainability.

Those factors affect companies' top and bottom lines, and few are likely to change in a downturn. Some may intensify. Product differentiation, for example, is all the more important in a down market, and ignoring these factors may be more perilous.

Ernst & Young sees cost-inflation, energy shocks, regulatory and compliance risk, consumer-demand shifts and what it calls 'radical greening' among this year's top 10 strategic risks for global business. Companies protect themselves by reducing supply costs, energy consumption and carbon footprints. 'Radical greening' risk entails not anticipating future compliance issues well enough amid a fast and fundamentally changing environment. Rather than going too 'radically' green, Ernst & Young says the more likely error is not going green enough.

Because of 'consumer demand shifts', smart companies can't just advertise; they must build 'reputational capital' with increasingly informed, web-savvy consumers, who demand assurance their products don't damage the environment or exploit workers. The rise of what Unilever CEO Patrick Cescau calls the 'conscience consumer' tracks the rise of web users and the rise in general public climate and environmental awareness. Fortunately, an economic downturn is not likely to make a dent in those trends.

The US lags behind Europe in green awareness, yet a Porter Novelli survey shows a group of US 'greenfluencers', some 4 per cent of the population, exerting influence on the rest of the mass market. Eighty per cent of US shoppers surveyed register as engaging in various levels of green consumer behaviour.

Green consumers may have less to spend

in a downturn, but they don't want green and ethical choices to be more difficult or tough. In good times or bad, they are best reached with products in mainstream outlets at mainstream prices. That requires integrating sustainability across the entire supply chain, as leading global companies are doing.

From 1995 to 2005, Chiquita, the world's largest banana producer, made major investments in upgrading all its farms to the 'Rainforest Alliance Certified' seal, assuring sustainable practices. It reduced water, energy and agrochemical consumption, and improved working conditions and efficiency. This cut costs 12 per cent, boosted productivity 27 per cent, assured reliable and sustainable supply, and built serious 'reputational capital' for Chiquita.

'Smart companies can't just advertise; they must build "reputational capital" with increasingly informed, web-savvy consumers'

In 2003, coffee company Kraft started buying coffee beans from Rainforest Alliance-certified farms. It now integrates tens of millions of pounds of these beans into mass market brands such as Kenco in the UK and Yuban in the US. Kraft's support accelerated a global, sustainable coffee programme that has brought 252,000 hectares of agroforest land under sustainable management practices and improved the lives of 1,260,000 farmers, farmworkers and their children.

But this costs money, and to justify it the programme has to make demonstrable business sense. A big demonstration came when Kraft landed a contract with McDonald's, which now sells Kraft certified sustainable coffee in thousands of its stores across Europe. Kraft is currently converting

green mortgage packages to pay for the installation of energy-saving technology.

Low-carbon is the answer

Given the potentially devastating impact of climate change, the long-term route out of the downturn will have to include a transition away from oil and towards a low-carbon future. This requires a seismic shift in energy and transport infrastructure and investment.

There are, however, some encouraging signs that the case for this is reaching the mainstream. Even that bastion of the global economy, the Organisation for Economic Co-operation and Development, now agrees with it. Its secretary general, Angel Gurría, said in a recent BBC interview that the long-term damage of the world doing nothing about greenhouse gases would far outweigh the short-term problems of the credit crunch.

its Nabob brand in Canada to Rainforest Alliance-certified and switching Nabob and Yuban packaging to 30 per cent lighter composite paperboard, containing 50 per cent recycled material and certified by the Forest Stewardship Council.

Kraft views sustainable coffee as an investment in brand equity and consumer loyalty, because it helps assure the long-term consistency, quality and continued viability of its supplier farms. That's also paramount for Unilever, the world's largest tea company, maker of PG tips and Lipton. By 2010, Unilever will sustainably source all tea sold in Europe, and worldwide by 2015, upgrading its farms to earn the Rainforest seal, including half a million smallholder farms and two million workers, producing 300,000 tonnes of black tea a year (12 per cent of the global market).

That global supply isn't assured long-term unless working conditions are safe and just, pesticide use is reduced or eliminated, farm communities are healthy and surrounding soils, streams and forests are protected – but when they are, Unilever gets the added advantages of brand insurance and product differentiation. As an early dividend and sign of the times, Unilever also landed a contract to supply tea to McDonald's European and Australian stores, largely because of its sustainable sourcing commitment.

There's no denying the global economy is fraught with uncertainties, but it would be simplistic and ultimately wrong to view that as inimical to greening trends, as if sustainability were an expendable luxury companies can't afford in tough times. There is nothing expendable about assuring the viability of supply chains, investing in brand loyalty and product differentiation, optimising regulatory compliance and aligning with strong consumer trends. Indeed, companies may well find a year from now that it was indispensable.

Tensie Whelan is executive director of the Rainforest Alliance.
www.rainforest-alliance.org

'We must chart a better course and come out of this storm with a greener, more progressive and stronger economy, and a fairer society'

An important attempt to sketch a green route out of the current downturn has been made by the New Economics Foundation in its 'Green New Deal', authored by economists and environmentalists including former Friends of the Earth director Tony Juniper, *Guardian* economics editor Larry Elliott and Green Party MEP Caroline Lucas. The manifesto calls for every home and office to become a renewable energy power station, for the creation of new green-collar jobs and a 'carbon army' to make the changes needed in renewable energy and energy efficiency. It also advocates an oil legacy fund supported by a tax on the windfall profits of the energy companies.

The May local elections and the state of the economy were widely seen as signalling the end of environment as a public and political priority.

Immediately after the elections, Number 10 rushed to reassure journalists that it had heard the message and would drop the environment to focus on the issues that hard-working families really care about. Gordon Brown's trip to Jeddah to plead for higher oil-production from the Saudis and other OPEC countries was a particular low point. Fortunately, he returned empty-handed.

The Prime Minister and David Cameron have both changed their positions in recent months. Gordon Brown is now belatedly focusing on some of the solutions that could get us out of this mess, with a far more aggressive push on renewable energy and energy efficiency (and also, wrongly, nuclear power). He was spurred on by a speech in June by David Cameron, in which the Conservative leader said the choice was not between economy and environment.

Cameron made a strong case for environmental policy as the way through current pressures, and made a commitment to a carbon standard for new power-generation. It was a much-needed statement of intent after a period of no significant Tory green initiatives. The Prime Minister's rhetoric on the downturn has been markedly greener since, but continuing support for new unabated coal power stations at Kingsnorth and elsewhere shows just how fragile such commitments can be, and how far there is still to go.

Politicians must deliver

Environmentalists (Green Alliance included) worry too much about which political party

will take up our cause and who might win the next election – the economic downturn is already making a bigger difference than anything that will follow it. The environmental movement in the UK has been critical in securing government actions, from the Climate Change Bill to the Renewables Obligation, but there is a long way to go, regardless of who wins the next election, and we will be bitterly disappointed if we simply sit back and wait for politicians to deliver.

To win the day, we urgently need to win the argument on two levels. First, ideology. Regulation and green tax are both out of fashion, but we will need to use both far more ambitiously to help make the necessary changes. Carbon trading alone is not the silver bullet the Government makes it out to be.

Second, we need the public with us. There are some tough challenges facing advocates of ambitious action; people are anxious about the economy and the impact on their lives of rising fuel, energy and food prices. Our job is to help them incorporate this new way of thinking into their day-to-day lives.

Some of the behaviours we want to encourage will cost more, and will seem out of reach. The ICM poll quoted earlier found that only 19 per cent of people said they would pay more for an environmentally friendly product. We have to demonstrate the bigger picture and the personal benefits of action now, and government has to support them to change.

Taking on the doom-mongers

We will face far more severe recessions than this if we don't tackle the environmental crisis now. A world of runaway climate change would be far more traumatic than anything we have experienced so far. The global economy would be shattered by the cost of falling food production, environmental refugees and extreme weather events.

Whether this is a recession or a downturn, it can be the turning point. We can and must chart a better course and come out of this storm with a greener, more progressive and stronger economy, and a fairer society.

This can only be achieved by developing new arguments, making tougher demands on our politicians and developing new alliances. We're on the right side of the debate about the future, so let's take on the doom-mongers. They don't know the way out. We do.

Stephen Hale is director of Green Alliance. www.green-alliance.org.uk

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EXCREMENTAL CHANGES

Sat on our thrones, we kings of convenience waste water, energy and a potential power source with every imperious flush. A simple reappraisal of the toilet's role could stop us going down the pan, suggests **Mark Anslow** »

ILLUSTRATIONS: MASA/WWW.BREEDLONDON.COM

It's the waste none of us likes to talk about. Our language has a wealth of euphemisms to describe it, some charmingly quaint, others obscene. It's the numbers one and two; it's spending a penny, doing one's business, passing water, visiting the bathroom, powdering one's nose or laying a log.

An unfortunate inheritance from our Victorian forebears, our aversion to discussing things scatological is deeply ingrained in our cultural consciousness. Today, however, those sensibilities are costing us dear – dear to the tune of roughly £120 million a year, in fact (see box, page 33).

For while no-one likes to think too much about what happens once we pull the chain in the little boys' or little girls' room, we are in fact squandering some of our most valuable resources in a way that makes neither environmental or financial sense.

Round the u-bend

Each pull of the chain sends our waste out into the soil pipe on the side of the house along with between six and 13 litres of purified drinking water. Once there, this 'blackwater' is usually joined by the household's 'greywater' – the effluent from sinks, baths, washing-machines and dishwashers – which contains soaps, fats and greases, detergents, food waste and small amounts of bodily products such as dead skin. This mix flows out under the road and into a communal sewer.

Usually driven only by gravity, the sewage stream continues through larger and larger pipes towards the nearest wastewater treatment plant. Along the way, it may pass industrial estates and factories, where it can pick up extra doses of heavy metals, organic wastes or inorganic chemicals. It may run alongside an airport, and be joined by rainwater contaminated with the glycol-based antifreeze used on runways. It may perhaps receive motorway runoff, laced with the salts used by gritting.

Arriving at the wastewater treatment works, the effluent first flows through screens to filter out large particles, then flows to a second pond, in which the organic wastes sink the bottom to become 'sludge', while the lighter, watery part ('settled sewage') is drawn

off separately. The settled sewage contains high levels of dissolved organic matter, which would seriously affect water quality if released directly into the environment, so it is exposed to the air as intensively as possible, either by dribbling it from sprinkler arms over algae-coated gravel pits, or storing it in a tank and bubbling air through it from underneath. After this, the nitrogen and phosphorus that remain in the settled sewage – products largely of our urine and detergents – have to be removed. Sometimes this is done using plants and bacteria, but phosphorus is often removed by 'dosing' the mix with iron or aluminium chlorides. Finally, the water may be passed through constructed wetland ecosystems, or exposed to ultraviolet light to kill any remaining bacteria.

Meanwhile, the solid sludge portion goes through separate processes, using pumped air or anaerobic digestion, where the sewage is stored in a heated tank in the absence of oxygen, allowing anaerobic bacteria to produce methane which can then be burnt as a fuel. The remaining sludge must then be dewatered and may need to be pasteurised to kill any remaining bacteria.

Heart of the matter

So what's wrong with our current system? Look closely, and you can see a number of elements within it that are considered 'sustainable' technologies. Anaerobic digestion – which produces biogas – is the new poster boy of green energy systems, with government ministers jumping at the chance to cut the ribbon on new facilities. Constructed wetlands to manage wastewater, which first appeared in 1970s, are the cornerstones of most ecological water-management systems. And some sewage sludge is even composted at the end of the process, recycling important nutrients back to the land.

The problem lies not so much with the components of the process itself, but with the system as a whole.

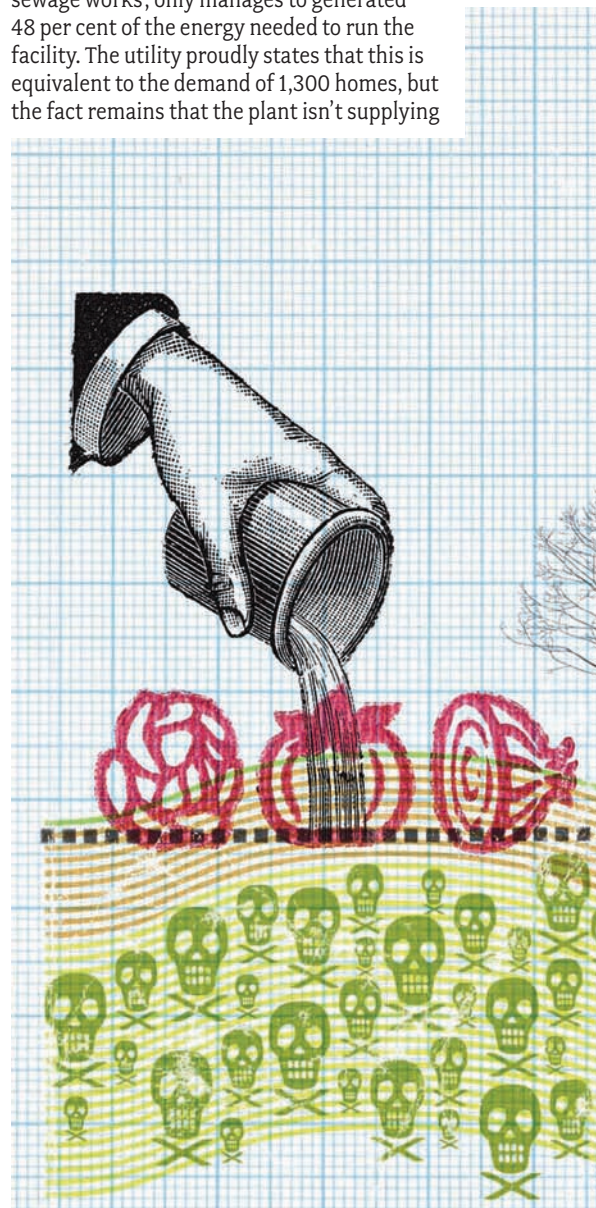
That system is vast: 300,000km of sewers serve 9,000 wastewater treatment plants, which in total receive more than 10 billion litres of sewage every single day. This gargantuan network consumes at least 1 per cent of all electricity in Wales and England, making the water utilities the fourth most energy-intensive industry in the UK.

Some of this energy demand is met by using the gas produced through anaerobic digestion – in fact, the wastewater industry is the largest user of anaerobic digestion technologies in the country – but the current systems were often installed with the primary aim of managing the sewage, rather than producing energy. David Woolgar is projects manager at Greenfinch Ltd, one the UK's most experienced anaerobic digestion companies:

'Anaerobic digesters have been around in the sewage industry for 80 years,' he says. 'They were originally focused on stabilising the sludge so that it could then be stored. Nobody was particularly interested in using the gas produced, and it was sometimes just flared or burned in a conventional boiler to keep the process running.'

Even today, with considerably more control over the process, better equipment and the opportunity to earn money by exporting electricity to the grid, anaerobic digesters at wastewater treatment plants struggle to cover their own energy demands. Thames Water's flagship plant at Reading, hailed as 'one of the UK's most technically advanced sewage works', only manages to generate 48 per cent of the energy needed to run the facility. The utility proudly states that this is equivalent to the demand of 1,300 homes, but the fact remains that the plant isn't supplying

‘The system is vast: 300,000km of sewers serve 9,000 wastewater treatment plants, receiving more than 10 billion litres of sewage every day’



any homes – in reality it struggles to supply just half of its own demand. Other plants have come closer to complete self-sufficiency, but there are almost none that actually export any energy to the grid.

Of course, being able to power a sewage plant from energy generated on site is a good thing – it avoids importing electricity that might otherwise be generated using fossil fuels – but the deficit highlights the fact that the facilities are huge energy consumers, gobbling up megawatts of power in an attempt to separate out the cocktail of pollutants brewed up in the UK's sewers.

Compost, anyone?

A similar situation arises when it comes to selling the waste products from a sewage plant. Despite being rich in plant nutrients, the products from a sewage sludge anaerobic digester can fetch as little as £2 a tonne. The reason is public suspicion. Consumers across Europe are extremely sensitive about the use of sewage sludge on the land, as witnessed by the media outcry in July, when it was revealed that farmers in the Midlands supplying major

supermarkets were using treated sludge to grow cereal crops.

People are right to be concerned. Although the chance of bacteria and viruses remaining in treated sludge is extremely small, it does often contain heavy metals, drug residues and human hormones. The metals are readily taken up by growing crops and return to the food chain, and the hormones can have serious impacts on wildlife, evidenced by lurid newspaper stories of 'gender-bending' fish.

Removing either heavy metals or hormones from water is extremely energy intensive, and the whole situation is neatly summarised by Joseph Jenkins, author of the reportedly cult *Humanure Handbook*:

'Collecting human excrement with wastewater and industrial pollutants seems to render organic refuse incapable of being adequately sanitised,' he writes. 'It becomes contaminated enough to be unfit for agricultural purposes.'

Still more problematic is that, even after the extensive treatment processes, wastewater plants are regularly found to be

environmental villains. A recent report by the Environment Agency found the water utilities to be the nation's biggest polluters of rivers and beaches, guilty of numerous counts of sewage overflows, as well as discharges (into watercourses) of ammonia, phosphorus and other chemicals. As quantities of sewage increase with population growth, the problem could become worse.

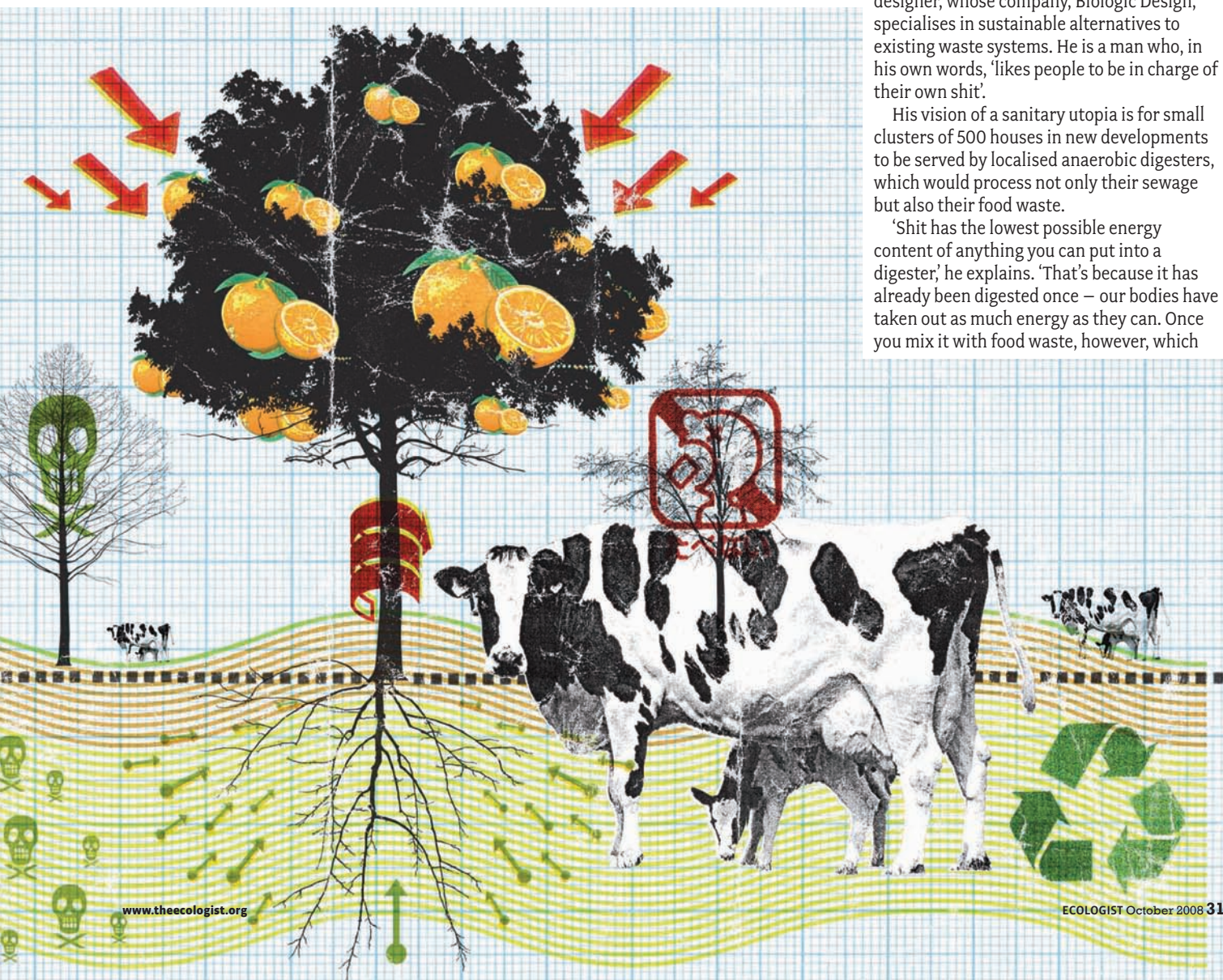
Rethinking our rear ends

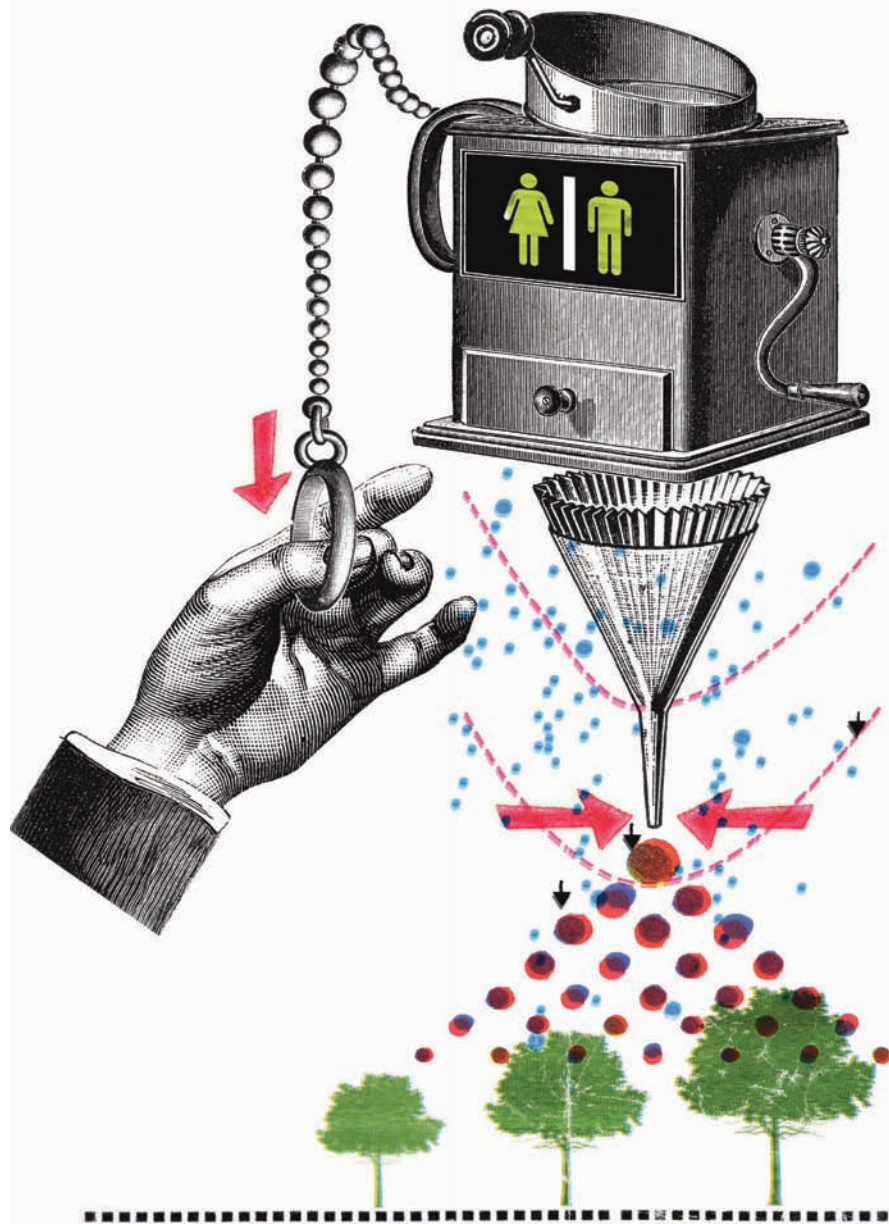
In their book *Lifting the Lid: An Ecological Approach to Toilet Systems*, Peter Harper and Louise Halestrap argue that sewage sludge is problematic 'because so much arises in relatively few places, and a good deal of energy and transport is required to treat and dispose of it'.

An overloaded and largely centralised system, the sewage network, much like our electricity grid, is beginning to look like a technological dinosaur. Fortunately, there are already people who have made our waste their bread and butter in order to develop some possible solutions. One is Jay Abrahams, sewage industry veteran turned eco-loo designer, whose company, Biologic Design, specialises in sustainable alternatives to existing waste systems. He is a man who, in his own words, 'likes people to be in charge of their own shit'.

His vision of a sanitary utopia is for small clusters of 500 houses in new developments to be served by localised anaerobic digesters, which would process not only their sewage but also their food waste.

'Shit has the lowest possible energy content of anything you can put into a digester,' he explains. 'That's because it has already been digested once – our bodies have taken out as much energy as they can. Once you mix it with food waste, however, which





TRY THIS AT HOME

While a nationwide decentralised sewerage system may be some way off, there are steps you can take to reduce the burden you place on the wastewater network and help recycle some of the nutrients you excrete.

It goes without saying that your own water use should be kept to a minimum – appliances should be ‘A’-rated for water use; WCs should be low-flush varieties or fitted with water-saving accessories.

Urine is almost completely sterile when it leaves the body (unless you are suffering from an infection) and can be used judiciously on garden compost as a nitrogen-rich ‘activator’ to kick the heap into action. Diluting it with water at a ratio of at least 1:8 will make a useful plant fertiliser, although the usual problems

with liquid fertilisers apply and care should be taken to avoid runoff or excessive nitrogen application. For more information, Carol Steinfeld’s book *Liquid Gold* (Green Books, 2004), tells you all you need to know.

For those with the room and enthusiasm, compost toilets are extremely sustainable methods for reducing water usage and making sure that your nutrients are returned to the soil.

By using sawdust to cover each ‘deposit’, smells are avoided and compost rates increased. Purchasing a toilet from an approved supplier such as Biologic Design or Thunderbox will ensure that red-tape-wielding officials are kept at bay. Joseph Jenkins’ *Humanure Handbook* (Chelsea Green, 2005) is indispensable reading.

hasn’t been digested, the gas yield from a digester shoots up.’

Abrahams thinks that mixing waste in localised digesters would be a real coup:

‘If the digesters are local, you can tailor the “recipe” inside them,’ he says. ‘You can incorporate food waste with farm waste and waste from food manufacturers. You could even just put food macerators in people’s sinks and send it straight down into a local sewer. This would really up the yield of biogas.’

The liquid fraction of such a process would still need to be dealt with, and Abrahams believes that a constructed wetland system filled with plants such as willow would do the job. This would not only purify the wastewater, but also provide habitat and valuable biomass for fuel.

The right stools for the job

Such a system could reconnect people with the nutrient cycles to which their waste belongs, as well as provide locally produced gas for heating and digestate products for local farms. Levels of contaminants in these digestates would be considerably lower than those from sewage plants simply because industrial wastewater and runoff water would not pass through the system – a practice endorsed anyway by the International Water Management Institute. Abrahams even thinks that financing could be arranged via local share issues, underwritten using the projected revenues from the sale of biogas.

Nor would this be untested science; in fact, some might see us as slow on the uptake. Thousands of farms across India, Sri Lanka and China have been using domestic-scale anaerobic digesters for years as a way of dealing with household, animal and crop waste, as well as providing cheap energy for cooking. In China, five million households or so are hooked up to digesters, and the United Nations Development Programme has recognised the technology as one of the most useful sources of decentralised energy.

If, one day, Abrahams’ vision comes to pass, what exactly could we do with the digestate from the reactors, full of important plant nutrients? Right now, the answer is not much. Currently, sewage sludge products are regulated by the enigmatically titled ‘Safe Sludge Matrix’, a Defra document that lays down strict guidelines on what can be done with digestates. If it is purified well enough, the digestate can be used on most crops, although they can’t be harvested for at least 10 months – not a particularly attractive option to arable farmers facing British summers and a food crisis.

Food waste products are even more heavily regulated, under the Animal Byproducts Regulations – the legacy of the BSE and foot-and-mouth crises. They must be pasteurised

at 70°C, are classed as 'waste products' and can only be spread on land once 'Land Use Exemption' certificates have been obtained – documents testifying that the land 'needs' the nutrients that the digestate can provide.

Many of these are sensible precautions when dealing with conventional sewage sludge, or with slaughterhouse wastes, but they appear as overkill to some in the anaerobic digestion industry, and look as though they will be slowly reformed. Only then, says David Woolgar, will the end products from digesters become truly valuable:

'At the moment, farmers know that we have to get rid of the stuff,' he admits. 'They want it, but they don't want to get involved in all the bureaucracy. When the bureaucracy drops away, a realistic price for this stuff will arise.'

Similar discussions are taking place among organic farmers. Although current EU regulations forbid the use of any human waste byproduct on organic land – even compost from compost toilets – Ben Raskin of the Soil Association believes things may change, although he wants to see more data on possible pollutants first:

'I think there are some [organic] farmers who would like to put pressure on to be allowed to use human waste products,' he says, 'but whether they would create a

A GOLDEN SHOWER

The UK produces approximately 25 million tonnes of wet sewage sludge each year. One tonne of this sewage sludge produces roughly 9m³ of methane. This gives a theoretical yield from our waste of 225,000,000m³ methane a year, but at least 45 per cent of this is needed to heat and run the anaerobic digestion process, and clean up the gas. This gives an available amount of 123,750,000m³ methane. If this methane were directly substituted for grid natural gas (roughly 7p per kWh now, or 81p per m³), it would be worth £100,237,500.

Anaerobic digestion reduces the dry solids content of human waste by as much as 30 per cent, meaning as many as 15 million tonnes of 'digestate' could be produced. Dr Stephen Smith, director of the Centre for Environmental Control and Waste Management at Imperial College London, estimates that the nitrogen and phosphorus content of digested sewage sludge could be worth £20,000,000 in terms of the artificial farm fertilisers it would replace.

Total value: £120,237,500

critical mass for change, I don't know.'

Perhaps the biggest obstacle in the way of sustainable sewage management, however, will be a deeply ingrained fear of human waste – identified by Joseph Jenkins as a severe case of national 'fecophobia'. When the Victorians were refining the WC, they thought that troublesome stools that just wouldn't flush away could be dealt with by simply designing higher cisterns using more water. It was some decades until engineers realised the design of the pedestal had far more of an impact on 'flushability' than the volume of water used.

It's a good analogy for how we currently think about human waste. If there's a problem, the solution must be bigger and more powerful – souped-up sewage plants and clever chemical dosing techniques. It takes someone daring enough to peer deep into the toilet bowl to see that, from a planetary perspective, this isn't necessarily the best option.

'We've got a nation of civil and chemical engineers who like big bits of kit,' says Jay Abrahams. 'Decentralised anaerobic digestion is too simple for them; they want something big and complex. But things will change – things are already changing.'

Mark Anslow is the Ecologist's News Editor

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LICENCE TO PRINT MONEY

A local currency – the Lewes Pound – is about to be launched. Those behind the East Sussex scheme say they are trying strengthen their community, and that it is a sign that localism is an emerging force in British life. The vast majority of money that goes into supermarket tills leaves the local economy immediately; local currencies keep money in the community and encourage village stores and businesses. For more information, see www.thelewespond.org

» Silly bankers

A report released by environmental NGOs has estimated that the Royal Bank of Scotland has loaned more than \$16 billion to coal-related companies in the past two years. The report notes that in 2007, RBS, HSBC and Barclays, loaned more than \$70 billion to controversial energy company E.ON. E.ON plans to build the first coal-fired power station in 30 years in the UK, with no guarantee that it will install carbon capture technology to reduce emissions. The report also shows RBS has loaned to coal-mining company Arch Coal, which practises 'mountaintop removal', a system that destroys mountains and produces large amounts of toxic tailings. Climate activists have been gathering to protest against RBS and E.ON. Student group People & Planet recently staged a 'die-in' in puddles of oil outside RBS HQ. Get involved at www.stopclimatechaos.org

» Save the Sasyk

Women in Europe for a Common Future (WECF) and the NGO *Vozrozhdenye* (Revival) are calling on your help to decommission the Sasyk Dam in the Ukraine. Located in the Black Sea, the dam was built 30 years ago in the hope of creating a new lake to provide irrigation for local villages. Once known for its curative qualities, the lake has now become an ecological and social disaster. The highly contaminated water affects the health and biodiversity of the area and its people. Unfortunately, the irrigation system is still financed by the authorities responsible and has not yet been decommissioned. See <http://wecf.eu/english/articles/2008/08/sasyk-dam.php> or contact project officer Anna Samwel at anna.samwel@wecf.eu

» **Plant more trees** Head to the Pennines and get digging with Treesresponsibility to save Yorkshire and Humberside one tree at a time. The 'tree roots' charity is committed to increasing tree cover in order to reduce flooding, while maintaining England's beautiful countryside and the wide range of animals it supports. If that's not enough, Treesresponsibility is known for the raucous organic cider-swigging festivities that follow a good day's planting. See www.treesresponsibility.com

» Say no to pesticides

A broadleaf pesticide known as Aminopyralid, which is produced by Dow AgroSciences, is coming under fire after crops grown in farm-bought manure failed to grow.

The contamination came from grass treated 15 months ago and which was used for silage fed to cows during the winter months. The hormone-based pesticide was still present in the manure used on allotments across the UK.

If you want to petition for the banning of Aminopyralid, go to <http://petitions.number10.gov.uk/aminopyralid>

» The Campaign Against Climate

Change march through central London takes place on 6 December. For information about the day and to learn how you can take part, visit www.campaigncc.org

CLICK4CARBON

Welcome to a new environment-conscious search engine. Using the same technology as Google, www.click4carbon.com offers information to users while donating profits to fund global forestation projects managed by the Plant-A-Tree-Today Foundation. The search engine also allows users to calculate their own carbon footprint, and offers advice on how they can reduce it.

TAKE A RIDE ON THE VEGGIE BUS

Crude oil may be running out, but Brighton's transport revolution is powering up – all courtesy of used fish and chip oil. **Jan Goodey** meets Tom DrUITT, the driving force behind the Big Lemon bus

When Tom DrUITT set up the Big Lemon – a community interest company that runs its distinctive yellow buses on chippy oil – a year ago, he knew it would be tough. But when you're up against an award-winning monopoly, Brighton & Hove (B&H) Buses, which runs 278 vehicles a day with 47 million journeys a year, and you have one route, five drivers and two buses, tough is not the word.

Lesser mortals might well have thrown in the oily rag, but not Tom, a 30-year-old Green Party member and keen mountaineer. It's the photo on his desk, in pride of place, of him smiling on top of an Alaskan mountain, as well as the high-visibility jacket, that are instructive here.

Tom gets stuck in; he drives his own buses and maintains them, and it's this approach that has recently put the company in profit.

Although, as he admits: 'I'm not in this to make money – none of us is [business partner Graeme Simpson has a full-time job]. Basically we try and make money so we can provide a sustainable service, rather than the other way round. My aim is to make a difference.'

Fuel from waste

With that in mind, the buses run on waste vegetable oil courtesy of a growing roster of Sussex chippies and restaurants, which stops one 'crime' – pouring oil down the drain – and obviates another: petrol. The oil is collected by Tom's new biodiesel supplier, Eastbourne-

based Bionic Fuels. The buses can use anything between 500 and 1,000 litres a week, although Bionic Fuels recycles much more than that and sells the rest elsewhere in Sussex.

Tom is currently working with the company on a promotional campaign that will include the restaurants supplying the Big Lemon, to make it clear to paying customers that Bionic supplies the buses with fuel – meaning added value for the restaurateurs as well as for Tom, whose buses all have signs saying 'run on recycled cooking oil'.

The buses were bought from a dealer in Tunbridge Wells, and actually didn't need converting. All that was required was a change in the filters at the beginning of operation and again after a couple of weeks, as normal diesel,



**Tom Druitt in
The Big Lemon
bus, which is
powered on
waste chip oil**

over the years, leaves a residue subsequently flushed out by the recycled oil.

What can't be filtered out quite so easily is the smell: when you stand on Lewes Road and one of the critters goes by on the Hitchhiker's Guide to the Galaxy-inspired route 42 (which runs between Sussex University and Brighton station) there is no mistaking the tell-tale waft of chip-shop fumes.

Mind you, there is some recompense: Tom has made it company policy that drivers are friendly and upbeat (not forgetting sweet-smelling). One regular customer to see the benefits is Laura Barraclough, a University of Brighton student. 'You don't get the same happy cheery drivers [with B&H Buses] that you do on the Lemon,' she says. 'I mean, do

you really see the managing director of B&H Buses actually driving a bus and listening to students and other people's opinions about their service? Sure they come more times during the hour, but...'

It is obstacles such as route-frequency that Tom has had to overcome – that and the bureaucracy of dealing with the local traffic commissioner, who is more geared to working with larger bus operators. Although the

'The buses run on waste vegetable oil, which stops one "crime" – oil down the drain – and obviates another: petrol'

commissioner agreed to the student-friendly route in the first place, problems surfaced in November last year, when, due to financial and other difficulties, the Big Lemon was forced off the road without giving the required 56 days' notice. Bearing in mind he had only one route, Tom was expecting a flexible response, but the commissioner kept the buses off the road until the 56 days had elapsed.

'At the beginning we took on too much and the passenger numbers weren't what we'd expected, so we needed to streamline,' Tom explains. 'I had six drivers in early December, and although I assured them they'd get paid at the end of the month, four left there and then.' As a result, Tom and fellow driver Colin Manderson had to take on all the driving.

'Colin's been in from the beginning,' Tom says. 'Something like this separates the men from the boys, I guess.'

Coached for success

Apart from these unforeseen hitches, it is the all-too-prevalent competition from B&H Buses that Tom and his team have been up against on a daily basis. B&H Buses run a service up and down Lewes Road every 10 minutes, and it is only the loyalty of eco-conscious students and private hires that has kept the Big Lemon bobbing along. Tom's buses ferry students in and out of town for Tuesday club nights, and he has also laid on vehicles for protests against the third Heathrow runway, festivals and the odd wedding.

In March, the Big Lemon introduced a new cost-saving route, avoiding the traffic hotspot of Brighton station and running instead from the university to the city-centre shops, which paid bigger dividends.

'It was great when we started to cover all our costs and make a bit extra on top,' Tom recalls. 'It was a long time coming, and for much of the time it seemed that the odds were against us, but it seemed, after all, that it could be done! We've had to raise our prices a little along the way, but our passengers have taken it well and I think they prefer to pay a little more to see us stay for good.'

The majority of the Big Lemon's loyal passengers, approximately 200 Sussex and Brighton University students daily, have arranged public meetings that have resulted in a members club of more than 30 'Lemonheads', as well as a 'Friends of the Big Lemon' Facebook group boasting more than 500.

With the service down during the holidays – July to September – the Lemonheads, Tom and staff are looking at buying a new coach, running a more frequent service and launching a promotional campaign along the way, with

'This is a fantastic service that could result in more routes and – who knows? – franchises in other cities'

investment for all of the above coming from 100 members willing to put in a returnable £100 each.

'We have almost all the 100 members now,' says Tom. 'This is a fantastic service that could one day result in more routes and – who knows? – eventually end up with franchises in other cities.' He laughs infectiously, reminiscent of that picture on his desk.

www.thebiglemon.com



The Big Lemon runs hourly in Brighton, but also takes people to festivals and eco demonstrations

Who's running on veggie oil?

Oil for boaters

Dan Carter and Jon Halle are two friends who live on barges in the Oxford Canal. In 2003, they started up Goldenfuels, a small workers' cooperative that collects waste vegetable oil from local chip shops, modifies it and sells it to boaters on the canal to use instead of diesel. It is less polluting than diesel (the company claims it brings the carbon footprint of users down by 70 per cent) and cheaper to boot (it currently sells at £1.10/litre). Carter and Halle have now started to run courses in order to train other people in how to do what they've done. www.goldenfuels.com

Four cars and a minibus

Duchy College, part of Cornwall College, has switched most of its transport fleet of four cars and a minibus to run on reconstituted vegetable oil or chip fat. The college currently buys approximately 10,000 litres of biofuel from a local supplier each week. Within the next year, the college plans to run the fleet on oilseed rape grown on site. This will save the college an estimated £400 per week, which would otherwise have been spent on petrol or diesel.

Ayrshire bio-bus

Stagecoach launched a pioneering bio-bus initiative in Scotland in October 2007 that allows customers to exchange used cooking oil for discounted bus travel. Eight vehicles in Kilmarnock run on 100 per cent biodiesel manufactured from used cooking oil and other food industry byproducts. www.thebiobus.com

Grease To Greece

The first-ever European Banger Rally powered by waste cooking oil, from the UK to the Mediterranean, departed London on 16 August. All entrants in the Grease to Greece Bangers (and Mash) Challenge had to run their cars on cooking fat, with the aim of promoting greener fuels. www.fatfinding.com

How to do it at home

Nearly all diesel engines can be converted to run on vegetable oil. For technical information or to purchase a conversion kit, go to www.veggiepower.co.uk, a website run by Chris Kennet, who ran a 'veggie power' workshop at this year's Climate Camp. 'There are a lot of people using vegetable oil in one form or another, including some famous names,' he says. 'Former F1 World champion Jody Scheckter (now an organic farmer) grows rapeseed oil to fuel his £100,000+ converted tractor.' Chris is keen to point out that some oils are more sustainable than others: 'Recycled oil is very good, as is locally produced, organic rapeseed oil.'

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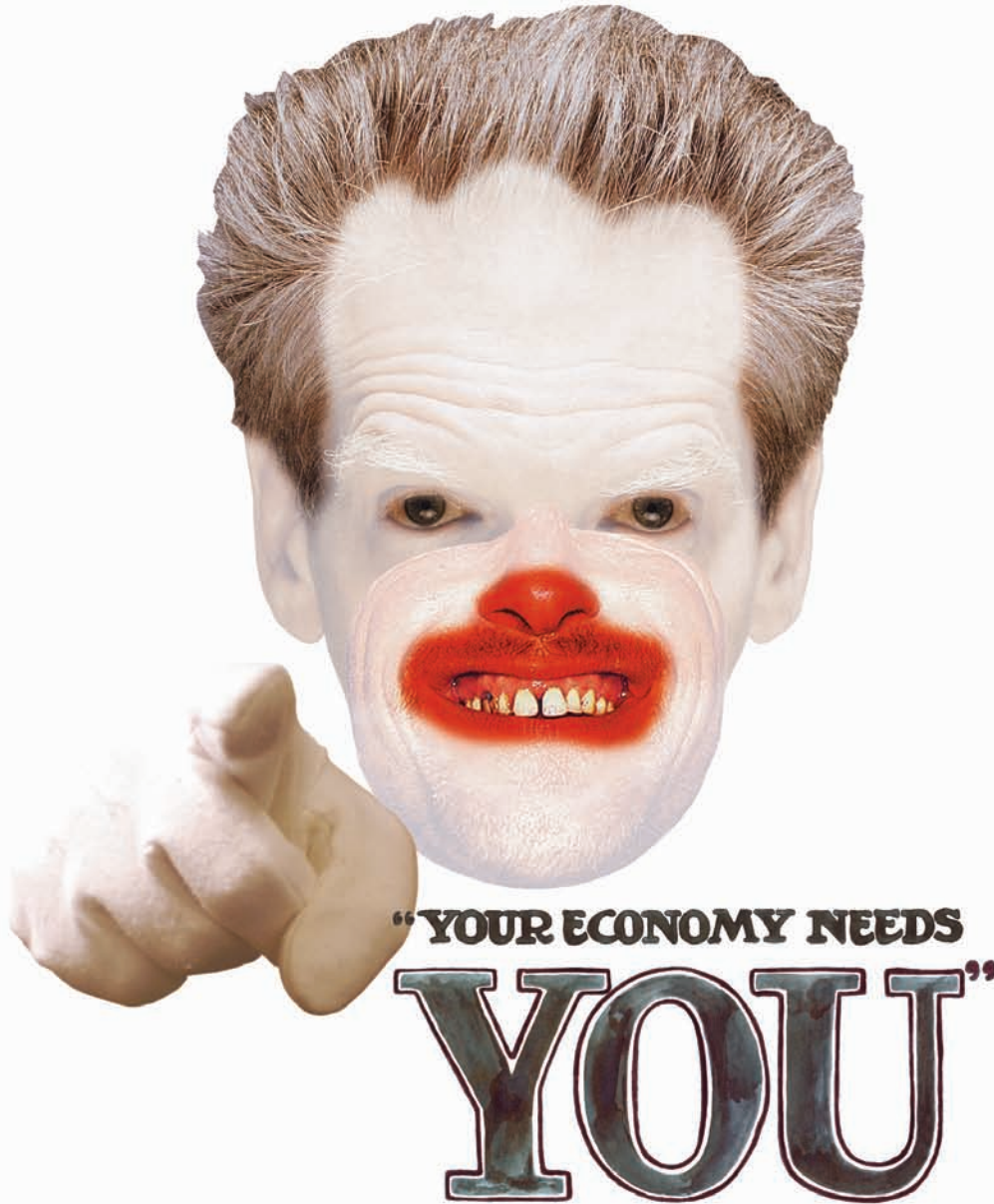


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Bill Archer

Dartford Football Club

With its grass roof, solar panels and low-energy lighting, the beautiful game now has its own beautiful eco home. **David Craik** meets the man making it happen

Experience tells you to expect certain things when you approach a football stadium. First, you'll see the floodlights towering into the sky; the stands will soon loom large and slanting, and then you'll see the walls of brick or concrete. You'll hear the noises – the songs and shouts of the expectant crowd – and you'll smell the smells: the burger vans and the police horses.

But walking to Dartford Football Club on match day is different. If it weren't for the crowd of people in front of you, with their replica white tops and scarves, it would be difficult to find Princes Park, the 4,000-capacity home of the 'Darts', who play in the Ryman Premier League.

Only when you get very close and you see the curved timber roof, and the almost delicately small floodlights poking up from embankments of grass and poppies, do you realise that this is a place of football.

'It's different isn't it?' smiles Bill Archer, co-chairman of the club. 'The stadium is sunk, so it keeps the noise down and also ensures that there is not as much light pollution as other stadiums.' Bill describes Princes Park, which opened in November 2006, as 'the first-ever eco-friendly sustainable stadium in the country'.

Other ecological features include a living grass roof, stands constructed out of sustainable timber, solar panels for the dressing rooms, two ponds at the north

end of the ground for reclaimed rainwater, underfloor heating and low-energy lighting.

Bill continually describes the stadium as 'fantastic', and standing on the terraces awaiting the start of a pre-season friendly against Championship side Crystal Palace, it's hard not to be impressed. The stands have open spaces allowing air and natural light to enter, and there isn't a single piece of litter to be seen.

Pointing to the large number of bins situated at the back of each terrace, he assures me that 'Our supporters are very proud of the ground and don't want to see it dirty. They don't throw any rubbish down.'

It's been a long road for the Darts to reach this point. 'We lost our original ground at Watling Street in 1992 after the bank

LOCAL HERO

foreclosed on us,' explains Bill, who became co-chairman in 2006.

For 14 years, the Darts played their home matches in stadiums around Kent. For Archer, who has supported the club since he was five years old, it was hard to take.

'We were nomads,' he says. 'I enjoyed many years at Watling Street. I am a Dartfordian and the club has given me a lot of pleasure. I wanted them back in the town.'

A feelgood factor

Bill became a director of the club in 2000, and began discussions with the local council about bringing the Darts home. Over time, the sympathy of the councillors to the idea began to grow, and a decision was made that a new stadium would be built.

He admits that the desire to ensure the stadium had environmentally friendly features was largely driven by the council and architects Alexander:Sedgley, but he was delighted with the plans.

'Because it was a newbuild it gave us the opportunity to introduce the green elements. We were asked our opinions and we said that it was the right way forward.'

There was little opposition to the plan within the council and the local community. 'Most people wanted to see the football club back,' says Bill, who admits: 'There was a feelgood factor about the stadium plan.'

A council-owned sportsground already existed on the site chosen for the build, but, according to Bill, it was losing money and in disrepair. The build took 48 weeks to complete and used sustainable materials in the construction. 'During the build we kept in touch with the council and we brought our players down to see the progress being made,'



he says. 'They all thought it was great and a lot of pictures were taken.'

Those same players are holding Palace 0-0 as the half-time whistle is blown.

We begin a tour of the stadium walking through corridors shining with natural summer evening light from the large windows above, ahead and behind. There is not a lightbulb in sight, and none is needed. Bill points to the timber frames used throughout the outside and inside of the stadium. 'It's Glulam timber, which is a renewable building material. It's also a great insulator and further saves our fuel bills,' he says.

We walk outside to look at the curved living

'We have had no vandalism at all, because this stadium is such a clean, relaxing place'

roof on the main stand. It is a hydro-seeded sedum green roof system designed to blend into the surrounding environment. 'It provides good heat insulation and insects and birds love it,' Bill explains. 'It also absorbs noise and is a great air-filtration system.'

We walk down to the main plaza area of the stadium. On either side, long grass and flowers grow. There is even a sign declaring 'Keep Off – Seeding in progress'. Certainly a rarity for a football stadium.

Next are the two man-made lakes. They provide water for the whole site, including urinals, and for watering the pitch, which is made up of only five per cent synthetic material. A total of 25,000 litres of water a day are needed for the pitch alone.

Bill says there is six weeks' worth of recycled water in the lakes (or one million litres).

The tour comes to the back entrance to the stadium. It is a steep road called Grassbanks – named presumably after the man-made hills of grass, excavated stones and poppies on either side?

'No,' answers Bill. 'At the old Watling Street stadium there was a section that had no terracing. It was just a steep grass bank, and those who stood on it were called the Grassbank Boys. I was one of them.'

An ecological feature before its time? 'No,' he laughs. 'It's just that the club couldn't afford the terracing!' At this point a faint whistle and low cheers are heard in the



The use of sustainable material – such as Glulam timber – has been vital in constructing the stadium



One of two lakes that collect rainwater. The pitch needs 25,000 litres of water a day



background. The second half has begun.

After the game ends, with a 2-0 defeat for the Darts, and the crowds begin to leave, Bill points to a large wooden statue on one of the terraces. It is called 'The Oak Man'.

'You'd think that it would have someone's initials scratched on it, but people respect it,' he says. This respect has been replicated throughout the stadium. 'We have had no vandalism at all, because this stadium is such a nice, clean, airy and relaxing place. Someone did write something in the toilets once about the manager, but he felt so guilty about it that he phoned up afterwards apologising and saying he would come back and clean up,' Bill says, laughing.

Stadium of enlightenment

The stadium is overlooked by private houses and Bill admits that initially there were concerns from residents about its impact. 'When we opened we used to have a residents' meeting every month. It started off with about 40 people, which went down to 20 and then down to 10. Local people are happy with the stadium. It is not an eyesore like other football stadiums.'

The management of the stadium, and its green features, will soon be Dartford FC's responsibility. 'We are just going through the paperwork now,' he explains. 'The council will still own the site but it wants us to run it for ourselves. It uses contractors, which we will do as well.'

What are the biggest maintenance issues with the stadium? 'It doesn't need much. We need to walk on the roof every three months or so and remove overgrown grass or things dropped by birds. We also need to check the



Top: The atmosphere in the environmentally friendly stadium has apparently helped the club attract players

Above: Supporters are proud of the stadium's green credentials. Bill is confident his team will soon be hosting Football League sides

Left: A Dartford FC player takes time out of a strenuous game to admire the pitch. The stadium's roof is also made from living grass

PHOTOGRAPHY: PHIL FISK

Come on you Greens! Other stadiums taking green steps

UK

■ Wembley Stadium, London

Not what you would call an 'eco stadium' by any stretch of the imagination, but it has recently had a carbon footprint/energy survey carried out by The Carbon Trust and is looking to switch to energy-efficient lighting. The pitch is watered at night to conserve water and is regulated by moisture sensors under the turf, meaning the water system shuts down after it has what it needs. Electric carts are used by the Wembley facilities management team for getting around the stadium. Wembley also claims to be well insulated and has full double-glazing. Plastics, paper, cardboard, glass, wood and scrap metal are all recycled, and pitch clippings and horse manure from events is sent to be composted and converted to mulch.

■ Millennium Stadium, Cardiff

The Millennium Stadium collects rainwater and stores it in a tank to water the pitch. Cardboard, paper and plastic recycling has been introduced throughout the stadium, and a 'Reduce, Reuse and Recycle' policy has been implemented for staff. All drinking cups used on event days and elsewhere

in the building are now made from 'biodegradable material'.

■ Deveronvale FC, Banff

The Highland League club is hoping to build wind turbines on top of two of its floodlights to power all the energy needs of its Princess Royal Park stadium. A club spokesman is confident the turbines will be operational within the next 14 months.

■ Hastings United FC, Kent

Hastings United Football Club wants to build a new football stadium and is looking to Dartford's Princes Park as a blueprint. 'We want to use the same architect and incorporate the same green features,' says chairman Dave Walters. 'We've talked to Dartford FC about the advantages of their stadium, but it is now all in the hands of our local council.'

GLOBAL

■ Washington Nationals' National Park, Washington DC, US

Opened for the Major League Baseball season this year, the stadium is fitted with energy-saving lights, water-conserving plumbing and drought-resistant plants.

A total of 5,500 tonnes of construction waste was recycled. It has a 6,300 sq ft green roof over the concessions area and it aims to save six million gallons of water a year. The stadium is certified by the US Green Building Council.

■ The Gabba, Brisbane, Australia

The Gabba boasts environmentally friendly and energy-efficient lights, which minimise 'spill' outside the playing field.

■ Frankenstadion, Nuremberg, Germany

Frankenstadion has a turf-irrigation system fed by rainwater cisterns.

■ St Jakob Park, Basel, Switzerland

St Jakob Park has a solar power unit on the roof to handle most of the stadium's power needs. Inside the stadium, waste is separated into 'green' and 'black' litter. The 'green' rubbish is disposed of ecologically. All catering articles are made from sustainable resources and can be disposed of in an environmentally friendly way. There are 90 double-waste containers in green and black placed throughout the stadium.

lakes for obstructions. We hope it will start paying its own way when we get it right. It's a low-cost stadium, with what we save in energy and water,' he answers.

Bill now has a growing appreciation of ecological issues. 'This stadium has enlightened me,' he says. 'If there are two ways of doing things then you should do it green. I think it has had a similar impact on the fans and the community. They can see that they can save money and have a nice building and atmosphere with eco-friendly features. I'm sure it has made many think about how they can go green as well. We can play that role.'

The club also invites schools to the stadium, and the children study and complete projects on the green features. Other non-league clubs have visited to talk about what they can do to follow Dartford's lead.

Bill argues that the stadium is having a large social impact as well. 'This is a big green building in the community,' he says. 'People see it is nice and they treat it well. The council says vandalism in the town is down, not just on Saturday when we have the kids here, but throughout the week as well. The stadium has helped improve social behaviour.'

On leaving, he says fashion designer Wayne Hemingway, who has visited Princes Park, recently described it as 'the best new stadium in the country' – ahead of the new Wembley, even. You can see it makes Bill proud, and he deserves to feel that way.



The eco developments overseen by Bill Archer, co-chairman of Dartford FC, have helped give his team a home advantage in the green stakes

PHOTOGRAPHY: PHIL FISK

www.dartford.gov.uk/princespark

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Festive fungi and mycological madness

Notwithstanding the resurgent interest in foraging for wild foods, including fungi, in this country we're still fairly mycophobic compared to our more bemushroomed continental brothers and sisters. It need not be so. With Roger Phillips's *Mushrooms* (2006), a comprehensive photographic guide to more than 1,250 British fungi, and John Wright's more gastronomically circumscribed and utterly delightful *Mushrooms* (2007), expert help is readily at hand.

And yet, there is far more to fungi than their gourmet potential. An exploration of that potential can deepen our respect for fungi and the intricacies of nature, banish irrational fears and make mycophiles of us all. To that end, one man is leading the way: Paul Stamets. His inspired and inspirational book, *Mycelium Running: how mushrooms can help save the world* is a mind-expanding ecological masterpiece and breath of fresh air compared to the current glut of depressing books detailing our slow environmental suicide.

Stamets considers fungi as keystone species, and their interlacing fine-webbed mycelia as the neurological networks of nature, weaving a living information-sharing membranous mosaic through virtually all habitats. Reflecting on soil as our prime ecological currency, he explores how we can stay in the black using complementary mycological systems to sustain



From toxin-fighting fungi and puffball pumpkins to Christmas chanterelles, the humble mushroom is a many splendoured thing – rich seasonal pickings for Fergus Drennan

and regenerate soils, helping plants survive starvation, dehydration and parasitisation. Such mycorestoration is examined through the application of mycofiltration: using mycelial membranes to filter waterborne pollutants, microorganisms and silt to mitigate erosion; mycoforestry: sustaining forest biocommunities through native forest preservation, recovery and recycling of wood debris, enhancement of replanted trees and strengthening ecosystem sustainability; mycoremediation: using fungi to degrade or remove environmental toxins including heavy metals; and mycopedsticides: fighting destructive insects and protect crops, for

example by utilising spores that are highly pathogenic to ants, locusts, termites, mosquitoes and other pests without harming non-target organisms, polluting water or impairing human health in the manner of conventional industrial pesticides.

Brimming with more insightful ideas than spores in a giant puffball fungus, Stamets's book playfully enriches our understanding and appreciation of the magical mystery that is the fungi kingdom. Indeed, a spirit of play goes a long way towards ameliorating the residual fungal fears that many of us needlessly harbour – especially when applied to unmistakable species such as giant puffballs (*Calvatia gigantea*).

In that playful spirit, and in celebration of the fact that fungi seem to be at their most prolific between my birthday on 22 October and Hallowe'en, let's have some fun with fungi...

Who's the puffball daddy??

Search in and around large nettle patches on moist, well-manured pasture and, with persistence and a generous helping of good luck, chances are you'll find not just one giant puffball but lots – five, six or even more is not unusual; certainly far more than even the most addicted, gluttonous and inveterate mushroom gourmet could ever eat. Last year I found six huge ones on 31 October, Hallowe'en – all unblemished, firm and perfectly white



throughout; prime candidates for eating but also perfect for making ghoulish flickering flame-faced giant puffball 'pumpkins'. Light the hallowed fire, draw a suitably hideous (but carvable) face on the puffball, slice off the top, hollow out large chunks of mushroom from the centre, cut into batons, batter (beer, plain flour, a pinch of salt) and deep fry in oil until golden brown. In the meantime, get to work shaping the glaring eyes and jaggedly ferocious teeth.

Let's not forget the growing popularity of Hallowe'en trick-or-treating, however. From the nearest damp and open pine wood, gather together a basketful of a fungus named Witch's Eggs – these can be seen just breaking through the pine needles at this time of year. They are the immature egg-like stage of the Phallus Stinkhorn (*Phallus impudicus*) and can be readily collected in large numbers. Despite

'Mycopesticides fight insects and protect crops without harming non-target organisms'

being separated from their mycelium, placing the unopened 'eggs' on walls or in flowerpots will result, a few days later, in the phallic fungus busting forth to erect maturity.

Trick or treat? It's hard to decide. Certainly children's faces are a treat, seeing this fungus for the first time; the trick is to render it edible – not easy given its stench when mature, although the 'eggs' make an almost passable glutenous curried mushroom soup. The Chinese dry the erect phallic structure, which can be readily purchased – no doubt as a remedy for impotence or to increase sexual virility.

Of course, fungi can also be objects of beauty and captured memories. As such, their Christmas gift potential is not to be overlooked.

There can be no better way to capture the sensual joy of copper sun-dappled ferns and the soft underfoot resinous damp of late-

autumn pine woods than by finding some pre-frost chanterelles (*Cantharellus cibarius*), brushing them clean and beautifully preserving them in the strongest vodka you can find: 45+ per cent – the perfect gift and aperitif before any meal (allow to stand for one month before eating or drinking). The gorgeous rainbow mix of colours provided by edible *Russula* species (the Brittlegills), the vibrant amethyst of the Amethyst Deceiver (*Laccaria amethystina*), the intense blood-red of Scarlet Waxcaps (*Hygrocybe coccinea*) and the delightful fragrance of Aniseed Funnels (*Clitocybe odora*) can similarly be captured in spirit – although flambé the latter before eating. Also, all but the chanterelles will benefit from the addition of fresh truffle slices. Pickling and presenting in an ornate jar or wide-topped bottle is another gift idea. This works well with Cauliflower Fungus (*Sparassis crispa*), small Bay Boletes (*Boletus badius*), Chicken-of-the-woods (*Laetiporus sulphureus*) and Jelly Ears (*Auricularia auricula-judae*).

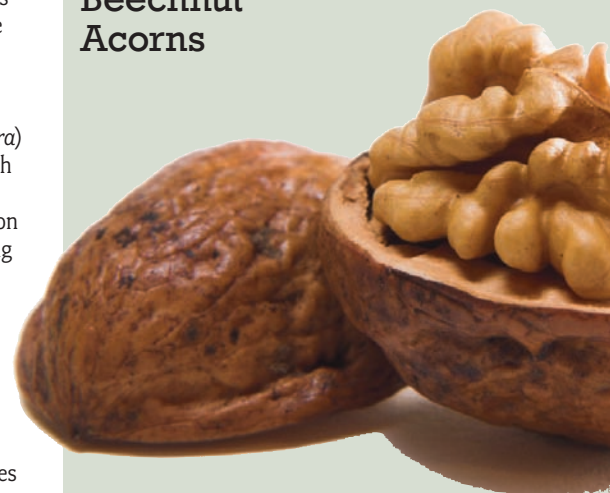
For fresh wild fungi to eat with your Christmas dinner, go for trumpet chanterelles (*Cantharellus tubaeformis*), which can be found in huge quantities, last year into January. These also dry very well and, again, make perfect presents. Even the first hard frosts need not be a source of fungal despair as frost actually stimulates the growth of some species: Wood Blewits (*Lepista nuda*; found Oct-Dec), Field Blewits (*Lepista saeva*; Oct-Mar) and Velvet Shank (*Flammulina velutipes*; Oct-Mar).

Above all, though, be safe this autumn. There are approximately 17 known deadly poisonous fungi and 65 poisonous, as well as numerous suspect fungi. Don't consume anything unless you are certain it's edible, and then only small amounts on the first occasion, to make sure your digestive system allows it. Gather with an experienced picker and buy yourself (or offer as a present) a good mushroom guide. Seasons greetings and happy hunting!

In season

Fungi
Seaweeds
Bullace plum
Sloes
Rosehip
Juniper berry
Sea buckthorn berry
Chickweed
Wintercress
Young nettles
Alexander
Seabeet
Sea purslane
Horseradish
Burdock root
Walnut
Chestnut
Beechnut
Acorns

Below: Walnuts are high in omega-3 fatty acids and can lower cholesterol



On the web

The Association of British Fungus Groups
www.abfg.org

Contact me

For more information or to get in touch, visit www.wildmanwildfood.co.uk

Why independent reporting matters

Since its inception in June, the *Ecologist Film Unit* (EFU) has causing a collective stir well beyond all initial expectations. **Andrew Wasley** reports

Four months ago we tried something different. The *Ecologist* pooled its resources with the ethical investigative agency Ecostorm and began making short documentaries under the banner of the *Ecologist Film Unit* (EFU). Who could have known it would be so satisfying and so successful?

Our debut, *Hell For Leather* – an investigation into the shocking human cost of Bangladesh's leather trade – was initially broadcast via the Green.tv portal and on the *Ecologist's* own site, before being picked up by the BBC World channel and subsequently transmitted to an audience of more than 100 million worldwide. From there the film spread rapidly on the web, via alternative news channels including OneWorld TV, the Real News, Undercurrents, the Hub and Friction TV.

The film's hard-hitting stance also attracted offers for screenings at a number of film festivals, notably the San Diego Film Festival's summer film series '35mm – Green' and the Seattle/San Francisco/Washington Green Festivals. One of the world's major fashion events, the Ethical Fashion Show, due to take place in Paris next month, has also pledged to air the film before a major catwalk event showcasing sustainable streetwear.

Filmed in Bangladesh over a two-week period, the film revealed how leather used in consumer goods, including shoes, handbags, trinkets and luxury car interiors – some of which find their way on to European high streets – is linked to serious health problems among tannery workers. It also exposed how the toxic chemicals used in leather-tanning lead to environmental degradation via the discharge of untreated effluents from tanneries into water supplies and waterways.

Although the animal welfare impacts of the leather trade have been the focus of much campaigning by animal rights activists, the ecological and social costs of the industry have been largely unreported – until now. *Hell For Leather* not only put the issue on the map in

consuming countries here in the West, but also helped raise the stakes inside Bangladesh, increasing awareness of a chronic problem and empowering grassroots activists as they take on those behind the leather industry.

Back on UK soil, the EFU followed up this initial success with the release of the controversial *Melting Point – The New Front Line In Environmental Activism*, which investigated the espionage, news manipulation, legal threats and violence that have become the knee-jerk response of government and Big Business to the increasing and vocal concerns of environmental protesters in the UK.

Released ahead of this summer's Climate Camp at Kingsnorth power station, the film received considerable coverage in the national press and highlighted issues seldom covered by sections of the mainstream media.

The film's exclusive interview with Sir David King proved to be the most explosive splash of the mix, however. In the course of filming, the former chief government scientist's said that the Heathrow third runway amounted to a 'white elephant', a comment that sparked something of a furore and resulted in follow-up articles in the *Guardian*, the *Times* and the *Telegraph*, among others.

Melting Point's examination of the events surrounding the previous year's Climate Camp at Heathrow, including the faking of headlines by London's *Evening Standard*, proved to be a

timely reminder of why a flourishing, truly independent media is vital for accurate coverage of environmental issues and the actions of activists combating problems.

Perhaps predictably, many journalists reporting on this year's Kingsnorth protest blindly regurgitated dubious claims peddled by the police and corporate spin-doctors, including the now infamous 'weapons cache' claim. As the protest got under way, Kent police claimed to have discovered a stash of knives and other weapons hidden near the protest camp. Campaigners say the items were planted in order to discredit the camp and generate negative headlines. The claim was never proven, and indeed this is a good example of why, more than ever today, independent, ethical reporting matters.

Hatching new projects

Our third film, *The Giriraja Chicken: India's Answer to the Global Food Crisis*, produced in conjunction with Compassion In World Farming and released exclusively in the UK (and featured on the *Guardian* website), examined the extraordinary way in which scientists and communities are working together to improve health, livelihoods and animal welfare in rural India using an ancient breed of chicken.

Intensively farmed chickens in India and elsewhere are typically given large quantities of antibiotics that threaten human health; they are also often fed on soya from the deforested wastelands of Amazonia in Brazil. Ordinary farmers who cannot compete with the vast economies of scale of corporate-owned farms – often cramming tens of thousands of birds into one shed – have been squeezed out of India's poultry market.

As our film revealed however, there are solutions, both local and global. Scientists at Bangalore University have developed the Giriraja or 'forest king' chicken, a hardy bird that provides nutrition and income for local people without the need for costly supplies of drugs and feed. The Giriraja is a living, breathing, micro-finance initiative that is giving back livelihood to those left behind in India's economic boom. At the time of writing, *Giriraja* is being prepared for release in India.

The EFU returns in November with a major foreign investigation, and is currently developing further important and exciting films for production and release in 2009. In the meantime, we want your input. Send us your stories, tip-offs and details of stories you believe need investigating.

More information

To watch *Ecologist Film Unit* films, go to: www.theecologist.org/ETV
Email us with your comments and suggestions at: efu@theecologist.org



Blue chrome runoff in an open drain in Hazaribagh, Bangladesh

Urgent appeal for £50,000 to save defenceless fox cubs – help stop the illegal bloodshed

The League Against Cruel Sports is calling for immediate support to save this year's fox cubs from cruel attack, torment and a slow and pain-filled death.

The taboo and highly secretive practice known as 'cub hunting' was made illegal under the Hunting Act of 2004 and the Protection of Wild Mammals (Scotland) Act 2002. This abhorrent behaviour is the brutal method by which huntsmen and women train dogs to chase and kill foxes.

Hunters surround the foxes' habitat and send in a pack of veteran and inexperienced hounds to find and kill the foxes. They flush



Extremist hunts target vulnerable fox cubs. Cub hunting was made illegal by the Hunting Act 2004.

out cubs and drive those who try to flee back into the jaws of the hounds, where the experienced foxhounds teach new dogs to rip the cubs to pieces. This is how they 'develop' their taste for fox blood.

**Donate now on
01483 524 250**

(Monday to Friday 9am to 5pm)

www.league.org.uk/donate

League surveillance teams have found disturbing evidence that extremist hunting parties continue to surround areas where foxes are known to live.

This behaviour is deeply suspicious and a worrying indication that the law the British public fought so hard to implement is being systematically and deliberately broken.

That's why the League is turning to the animal-loving British public once again to ask for their help to protect hundreds of this spring's fox cubs.

Please will you make a donation of £30 or more to help save them from torment and brutal death?

The League needs surveillance equipment including **video cameras with telephoto lenses (£1500)** and **GPS machines (£65)** to monitor hunts and gather evidence that is admissible in court. Sometimes just the presence of cameras forces these bloodthirsty extremists to call off illegal hunts.

Flagrant lawbreaking and unspeakable cruelty to defenceless young animals must stop. Cub hunting has always been a secretive practice, so League campaigners must bring this abhorrent behaviour to public attention and help bring prosecutions against illegal hunting parties.

We must show them that nobody is above the law.

Please make an urgent donation of £30 or more today. Thank you.



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GAIA
THINKING

Spot the bomb

**NO MORE
LANDMINES**



Simon Conway

Please send a donation of £25 or more to No More Landmines to help rid Lebanon of the unexploded cluster bomblets that litter civilian areas.

Zahra didn't



Alison Locke

For a 12 year old girl like Zahra spotting the bomblet is no game. While a trained de-miner is able to recognise an M42 submunition, to a child it could just be a toy.

Urgent appeal to rid Lebanon of 'UXO'

One million unexploded cluster 'bomblets' litter South Lebanon, primed and ready to blow an inquisitive child or unsuspecting adult to bits.

No More Landmines needs funds now to detect, deactivate and remove cluster bomblets and other deadly unexploded ordnance (UXO) from civilian areas. Please send your donation today so another child's innocent game doesn't end in tragedy.

Landmines and other indiscriminate explosives have been used extensively in Lebanon since the beginning of the civil war in 1975. Because of this, unexploded weapons, including cluster bomblets, have littered the country long before the hostilities of 2006.

The 34-day conflict between Israel and Hizbullah in 2006 claimed the lives of an estimated 1,000 civilians in Lebanon – about one third of whom were children. Tragically, the death and suffering did not end there for the Lebanese people.

“What we did was insane and monstrous, we covered entire towns in cluster bombs.”

Head of an Israeli Defence Force rocket unit posted in Lebanon during the war, quoted in Haaretz daily newspaper, Israel, 12 September 2006

In the last 72 hours of the conflict – after the ceasefire had been agreed on 11 August 2006 – the Israeli forces launched the majority of their remaining cluster munitions towards South Lebanon.

Cluster munitions are missiles that contain dozens of smaller bomblets. They are launched by artillery, rocket launchers and aircraft. The cluster munitions break open at low altitudes to release their merciless payload.

The UN Mine Action Coordination

Centre in South Lebanon, however, estimates that only 60% of those bombarded on Lebanon detonated.

Today an estimated one million unexploded cluster bomblets fired by Israeli forces litter the villages of South Lebanon.

Already more than 250 adults and children have been killed, injured or maimed by unexploded cluster munitions, many while checking the damage to their homes or working on their land.

DONATE NOW
020 7471 5580
(Monday to Friday 9am to 5pm)
www.landmines.org.uk

No More Landmines funds specialists to comb through thousands of acres of civilian areas – cities, towns and villages plagued by cluster bomblets and other deadly unexploded ordnance – to make sure every cluster bomblet is destroyed before it can ruin another person's life.

Please send the greatest donation you can afford, today. Every £25 clears 25 square metres of land. Please act now. Every day that passes leaves children at risk of death or horrific and debilitating injuries. **Thank you.**

YES, I want to rid Lebanon of unexploded cluster bomblets

I enclose a gift of: £25 £100 £500 My own choice of amount £

I enclose a cheque/postal order made payable to No More Landmines OR

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Card no. Valid from

Expiry date Security code (last 3 digits on the signature strip) ISSUE NO. (Maestro only)

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No More Landmines will not pass your details to other organisations. We will write to you occasionally through the year to keep you updated on current projects and appeals and how your support is helping to touch lives. Please tick this box if you do not want this information to be sent to you.

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I am a UK taxpayer and would like No More Landmines to treat all donations I have made since April 2002 and all the donations I make hereafter as Gift Aid donations. I understand that I must pay an amount of income tax or capital gains tax at least equal to the tax the charity claims on my donations in the year.

I am not a UK taxpayer. *giftaid it*

**NO MORE
LANDMINES**





DAILY LIFE

Celebrate Apple Day; put the clocks back; cook a marrow; run for the trees; enjoy eco art and eat biodynamically. By Laura Sevier

OCTOBER

'Ancient trees are precious. There is little else on Earth that plays host to such a rich community of life within a single living organism'
– Sir David Attenborough

Full of nooks and crannies, holes and dead and rotting wood, ancient trees support wildlife, providing a home for thousands of species of plants, animals and fungi, including many rare and threatened species.

They're as much a part of our heritage as stately homes, cathedrals and works of art – although they do not enjoy the same protection. Many ancient trees stand unprotected, often from neglect or a lack of awareness of their great importance to our heritage and wildlife.

In most parts of the UK you will see them scattered around, whether on village greens, in urban parks or as part of a woodland.

Help the Woodland Trust to find, map and protect ancient trees by getting involved in its Ancient Tree Hunt (ATH), a five-year project running until 2011. 'We're asking people to look out for and record trees which are particularly old, fat and gnarled,' said Woodland Trust president Clive Anderson. 'Perhaps you pass a great old tree every day... We'd love you to go online and tell us about it.'

For more information, visit www.ancient-tree-hunt.org.uk

Spotlight on Ancient trees



Acorns to Ancients

During its 'Acorns to Ancients' seed-collecting month (23 Sept–23 Oct), the Woodland Trust is encouraging people to collect seeds such as acorns, beechnuts, ash keys, hazelnuts, rowan berries and crab apples from the local ancient trees recorded at www.ancienttreehunt.org.uk, where there are instructions for nurturing them into new trees to create the ancients of the future.

3 THINGS TO DO...

Read

The Self-Sufficient-ish Bible: An Eco-Living Guide for the 21st century by Andy and Dave Hamilton (Hodder & Stoughton, £30)

A one-stop book full of ideas and practical tips covering everything from how to darn a sock to how to keep food cool without a fridge. Includes a detailed section on growing your own fruit and veg.
www.selfsufficientish.com



Visit

During Magazine Week, the **Ecologist** will be taking over Borders in Oxford (30 Sept) and Cambridge (2 Oct) from 6pm. Join us for our live debate **Meat: Eco Villain or Victim of Spin?** with guest speakers and a chance to ask questions.

Join

Garden Organic A great resource for organic gardeners. For tips and information, see www.gardenorganic.org.uk

9 Oct

New Ethical Boutique

Ethical clothing boutiques are a rare species on the high street, so the opening of a new one is a cause for celebration. Emmeline 4 Re, opening on 9 October in London's West End, offers designs from the Emmeline 4 Re label, jewellery by Uncommonly Beautiful, underwear by Amira and shoes by Beyond Skin. Profits from the store will go to the Salvation Army and be channelled into global aid projects.

Emmeline 4 Re, First Floor,
9 Princes Street, W1

www.emmeline4re.co.uk



this month

By Laura Sevier

3-19 Oct Biodynamic Food Fortnight

Planting by the moon and stars, and using special preparations (made from fermented plant and mineral materials) may sound wacky to some, but biodynamic farmers swear by it, saying these methods result in tastier, higher-quality food with excellent nutritional values. Don't believe them? Then try it for yourself. Biodynamic Food Fortnight is an ideal opportunity to sample and buy biodynamic fruit, vegetables, meat, dairy and other products at farm events and selected restaurants, cafés and stores around the UK. It kicks off on 3-4 Oct with an event at London's Borough Market.
www.biodynamic.org.uk

21 Oct Apple Day

A great excuse to indulge in and celebrate the taste and variety of homegrown apples, there will be apple-inspired events around the UK on the weekends before and after this date. See Common Ground's website for details.

www.commonground.org.uk/appleday/a-events.html

At some events there will be much more on offer than simply apples. At the **Apple Festival**, for instance, held on 18-19 Oct at Middle Farm, near Lewes, East Sussex, there will be two music stages, Morris and clog dancers, a funfair and puppet show, food and drink from local producers, a cider bar, hog roast and crepes.

www.middlefarm.com





25 Oct

Feed The Birds Day

Providing a little food, water and shelter can really help birds through the winter – and turn your garden into a wildlife haven for you to enjoy.

www.rspb.org.uk/feedthebirds

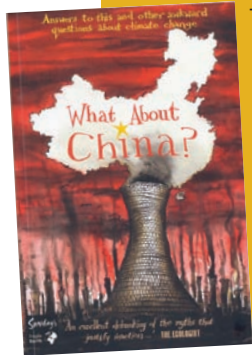
26 Oct

GOODBYE SUMMERTIME

The clocks go back by an hour, marking the end of British Summer Time (BST) and the return to Greenwich Mean Time (GMT).

New release

What About China? (Alastair Sawday's Fragile Earth series, £6.99)



Tricky environmental questions get precise and entertaining answers in this must-have book, which draws on the knowledge of experts at the Soil Association, Waste Watch, Ecover and Triodos Bank.



PICKS OF THE MONTH



ROSEMARY is one of those herbs that seems to have it all. An attractive aroma, with antiseptic, antibacterial, anti-inflammatory, antidepressant properties, it is said lift the spirits and dispel anxiety, as well as improve concentration, boost circulation, cure a hangover and ease muscular pain. BAMFORD ORGANIC ROSEMARY BODY CREAM, blended with organic plant extracts, including jojoba seed oil, shea butter, and soothing aloe, is ideal for dry skin in need of a treat

www.bamford.co.uk

HIGHGROVE ORGANIC ROSEMARY AND GINGER WARMING BATH OIL is infused with arnica and will help relax aching muscles after gardening or exercise. The Highgrove range has been formulated by the founder of The Organic Pharmacy, Margo Marrone.

www.theorganicpharmacy.com



FOOD IN SEASON

Fruit and Nuts

Apple
Blackberry
Chestnut
Crab apple
Damson
Fig
Medlar
Pear
Quince
Sloe
Walnut

Vegetables

Aubergine
Beans (runner)
Beetroot
Broccoli
Brussels sprouts
Cabbage
Cardoon
Carrot
Cauliflower
Celeriac
Celery
Courgette
Cucumber
Fennel
Garlic
Jerusalem artichoke
Kale
Kohlrabi
Leek
Lettuce
Marrow
Mushroom (wild)
Onion
Parsnip
Potato
Pumpkin
Radish
Shallot
Sorrel
Spinach
Spring onion
Squash
Swede
Tomato
Turnip



Above: Pears are high in levulose, the sweetest of natural sugars



Above: Boil, stew or roast your parsnips

3 OF THE BEST... BRITISH-GROWN APPLES

WORCESTER PEARMAIN
A sweet-tasting apple with a distinctive strawberry perfume. Conically shaped with bright red skin that contrasts with its white flesh

COX'S ORANGE PIPPIN
Probably the best-known of English eating apples, the real English Cox is a complex blend of many flavours, aromatic and rich with tender and juicy flesh. Its greenish-yellow to orange colour is streaked or shaded with red

SPARTAN
A good ripe Spartan is perfumed, very sweet and fruity. The flesh is white, crisp and juicy, and aromatic even before the fruit is cut.



23 Oct

Ethical Trade – The Next Decade

Thanks to the Ethical Trading Initiative, an alliance of companies, trade unions and campaigning organisations working to improve the lives of workers in global supply chains, workers' rights are now firmly on the map for many retailers –

at least in theory. Now, says ETI director Dan Rees, 'it's time to get radical. It's no longer acceptable for companies to hide behind their audit reports – they need to drastically improve business practices'. The ETI

10th Anniversary

Conference, in West London, will address what needs to happen over the next decade: it's a must for NGOs, retailers, suppliers, agents, trade unions and auditors.

www.ethicaltrade.org



4 WAYS TO COOK... MARROW

- STEAM IT** Sprinkle with salt and steam for 20 to 40 minutes depending on the age and size of the marrow
- BOIL IT** Peel, seed, cube and boil for 10 minutes in salted water
- FRY IT** Sauté in butter and herbs for 8 to 12 minutes, while shaking the pan occasionally
- STUFF IT** Cut the marrow in half lengthways, sprinkle with olive oil and bake in a medium oven for approximately 20 minutes until browning and cooked through. Scoop out the seeds, season the marrow with salt and pepper, then stuff with your chosen combination of veg, rice, herbs, nuts, lentils or cheese. Bake for a further 20 minutes until golden brown

this month

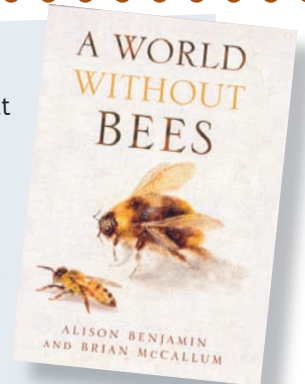
Run for the trees

Support Trees for Cities this autumn and help the organisation plant more urban trees. Run the 5km Tree-Athlon in either London (20 Sept), Leeds (28 Sept) or Manchester (5 Oct) (www.tree-athlon.org) or join the teams for one of their planting events throughout the season. www.treesforcities.org

Save Our Bees

Honey bees are dying in all corners of the world at a devastating rate. We need to act quickly, not least because they pollinate a third of our diet – primarily fruit and vegetables. As Albert Einstein is reputed to have said: 'If the bee disappeared off the surface of the globe, then man would only have four years of life left. No more bees, no more pollination, no more plants, no more animals, no more man'. Find out more:

- **Online:** see Pat Thomas's article 'Give bees a chance' at www.theecologist.org
- **In print:** In *A World Without Bees* (Guardian Books, £9.99), authors Alison Benjamin and Brian McCallum cross continents to investigate what is killing the bees
- **On YouTube:** Type 'disappearing bees' into the search engine for at least 20 related videos
- **Help spread the word:** *The Vanishing of the Bees*, a documentary in the making, needs help with funding. Watch the trailer on www.vanishingbees.com/trailer.html
- **Make your garden and neighbourhood bee-friendly:** Find out how to encourage bees to stay in the neighbourhood on the Bumblebee Conservation Trust's website, www.bumblebeeconservationtrust.co.uk





Give Me Shelter: 26 Sept



Super Kingdom: 21 Sept

ECO ART

26 Sept-27 Sept 09 Give Me Shelter

A wooden hut in dense woodland. A stone tower. Two vast clay domes in an ancient woodland (top)... Safe havens or sinister traps? These are some of the artworks you can expect to see at this year-long exhibition in the grounds of the National Trust's Attingham Park, Shropshire. Featuring work by 11 artists commissioned by Meadow Arts, it examines our contradictory relationship with the natural world: we exploit and ruin it, yet we romanticise it and rely upon it to provide us with shelter from cataclysmic disasters linked to global warming and increasing pressures on resources.

www.meadowarts.org

27 Sept-19 Oct Slow Art Trail

Combine eco art appreciation with a slow ramble around the Yorkshire Dales National

Park at this ambitious public art project, developed by Chrysalis Arts. The

six artists include Laura Ellen Bacon (left) who creates woven, site-specific sculptures in willow and other coppiced materials, kinetic sculptor Johnny White, and Stephen Bailey, who will create a large-scale map of the walk from 'found' materials within Strid Woods.

www.chrysalisarts.org.uk



Slow Art Trail: 27 Sept

21 Sept onwards Penthouses For Birds?

When towns expand and woodlands are replaced with human homes, the animal kingdom is inevitably forced to move on. 'Super Kingdom', an installation based in King's Wood, Kent, explores the impact of urban development on the natural world. London Fieldworks (artists Bruce Gilchrist and Jo Joelson) researched hibernation patterns and have created a series of 'show homes' for

the animals of King's Wood 'based on the architecture of despots' palaces' – including Stalin's Palace of Science and Culture (top right).

www.stourvalleyarts.org.uk

20 Sept-30 Nov Urban/Ecology

Even if we live in a city, ecology still has a crucial relevance to our lives. This is the theme of the Urban/Ecology project, in Liverpool, created by the Gaia Project, an independent environmental artists' group. The project will feature public events and artworks around Liverpool, as well as in the Gaia Cabinet space in the historic Albert Dock, to illustrate the importance of ecology across the city.

www.urban-ecology-liverpool.wetpaint.com

25 Sept-11 Jan Cold War Modern

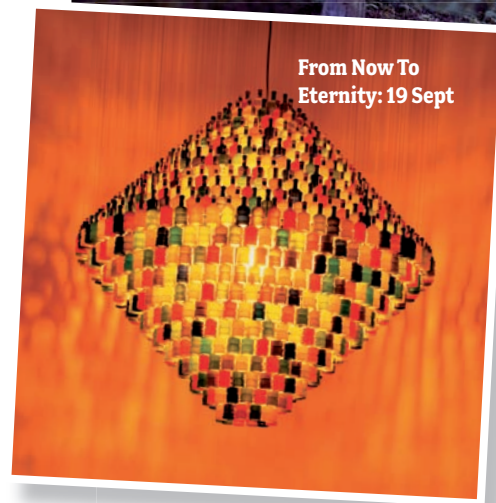
The Victoria & Albert Museum's autumn exhibition, 'Cold War Modern', which looks at design, art and architecture in the years 1945 to 1970, may not sound particularly eco, but its final section examines the birth of the environmental movement in some detail. It includes architects and designers engaging with themes of nuclear and ecological devastation, and architectural visions for an environmentally safe future.

www.vam.ac.uk

19 Sept-19 Oct Uses For Old Plastic

There's no escaping the fact that plastic is one of our biggest recycling challenges. 'From Now to Eternity', at the Biscuit Building, east London, taps into the imagination of nine leading contemporary designers, commissioned by Arts Co, to show how this material can be reused. The plastic chandelier (above right) made from 1,000 exploded party poppers is just one of the resulting creations.

www.arts-co.com



From Now To Eternity: 19 Sept

New release

Eat Your Heart Out by Felicity Lawrence (Penguin, £8.99)

Why is it that a handful of ingredients, such as soya, corn, and palm oil, keep cropping up in everything from cat food to baby food to processed meals? In her revelatory new book, Felicity Lawrence travels from Lincolnshire to Brazil and to Senegal to investigate. Essential reading for anyone who cares about their health and our planet.



Discover your green potential

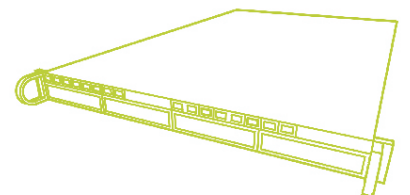
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“a call centre with 560 PCs could reduce its electricity bill by around £85,000 a year, simply by switching to GreenHive” *Hexus.net, March 2008*



“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		37W
GreenPC Treeton		29W
GreenHive		9W per user

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

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Craig Sams and Jo Fairley

Founders of Green & Black's chocolate

What book or film would you recommend to all politicians?

The Future of Food (2004), directed by Deborah Koons Garcia. It cuts through all the crap about genetic engineering and shows clearly how it is the last thrash of a failed agricultural technology from an agribusiness industry that has lied, cheated and bribed its way into control of our food supply.

What keeps you awake at night?

In season, foxes mating at the top of the garden. The rest of the time, the desperate incompetence and lack of political will to do something about global warming.

What/who makes you most happy?

Jo: Craig.

Craig: Jo.

What is your favourite meal? Made by whom?

Craig: I love Jo's tofu, marinated overnight in masses of tamari soy sauce and grated ginger, and baked.

Jo: I love Craig's tuna fish pie (using Fish 4 Ever tuna only). We both had a fabulous meal when we joined Kylie Kwong for dinner at her amazing organic Chinese restaurant (Billy Kwong) in Sydney – one course after another of organic, sustainably harvested and unbelievably delicious food.

What is the greatest compliment you've ever received?

Craig: When I visited my grandparents' ancestral village I met my grandfather's sister, who grabbed my sleeve as I got on the bus to leave and commented: 'Please don't go. If you stayed here nobody would ever grow old'.

How do you define success?

Sleeping well, no fatigue, good appetite, good memory, good humour.

What advice or words of wisdom would you give someone just starting an 'ethical' business?

Three things: cash flow, cash flow, cash flow. The best ideas and the most profitable ideas can founder if you can't pay your bills. Always make sure that the business model ensures there is enough money to lubricate the wheels of trade.

Can you describe a typical work day?

We both get up at about 6am and work for an hour or so. The papers arrive and we settle down with a pot of tea and read them, either in bed or in the garden. Jo may go off to yoga at 8am; I either take a walk or go to my Pilates studio at some point in the morning. At lunchtime in the summer

we may walk down to the beach for a swim. Mostly, however, we work quite hard – there's so much going on. I work on my smallholding or woods for about one day a fortnight, and that helps keep me grounded and sane, and to work up a good sweat. We both have days in London or Bristol (roles at the Soil Association), but we keep certain tasks such as writing or reading for the train journey, knowing it's an hour and a half of undisturbed concentration.

If your house was on fire, what one thing would you most certainly save?

Our iPhones! They should be called Lifephones, in fact – they have all our favourite music, important photographs and everything we'd need to start again.

What is the best way to enjoy Green & Black's?

Break off a piece, pinch your nose, pop it into your mouth, chew it until it's broken up, press it against the roof of your mouth and then let go of your nose. The flavours will hit you all at once and you really appreciate the complexity and smoothness that reflects the near-perfect fermentation practices of the farmers who have been supplying us for the past 15 years.

Craig Sams and Jo Fairley are the authors of *Sweet Dreams: The Story of Green & Black's* (Random House Business, £14.99)



This page: Ciel 'Georgia' dress in organic cotton with liberty print and natural shell buttons; belt, stylist's own

Inset: Makepiece Pink Heliconiini shrug in soft brushed English mohair; Stewart+Brown yellow tank top in organic pima cotton; Enamore Mia shorts made from a vintage cotton print; Nahui Ollin purple bag handmade from recycled wrappers



Fashion

The London Fashion Week exhibition Estethica is where the best in eco and ethical fashion finds its voice.

The *Ecologist* previews fashion's cleaner, greener footprint

www.londonfashionweek.co.uk/estethica



for change!

This page: Noir white leather biker jacket;
Stewart+Brown organic cotton crochet dress;
Stewart+Brown blue organic Pima cotton dress;
AmazonLife bag made from recycled tent canvas
and natural sustainable rubber; Veja shoes

ECO FASHION



Above: Noir black bodysuit; Lunar hemp/silk white sleeveless crepe dress; Beyond Skin shoes; Stewart+Brown Mongolian cashmere shrug

Right: From Somewhere dress



Right: Junky Styling purple-stripe shirt; Elena Garcia bamboo satin 'Button' trousers; Beyond Skin shoes; Fifi Bijoux ethically mined gold necklace; Ignes 'Baby Millie' patent cowhide tomato-red handbag



STOCKISTS

READY-TO-WEAR DESIGNERS

ANATOMY

www.anatomyfashion.co.uk

ARTICLE 23

www.article-23.com

CONSCIOUS DESIGNER

COLLECTIVE

HOUSE OF TAMMAM

www.tammam.co.uk

ELENA GARCIA

www.elenagarciastudio.com

CIEL

www.ciel.ltd.uk

DEBORAH LINDQUIST

www.deborahlindquist.com

ENAMORE

www.enamore.co.uk

ENVIRONMENTAL JUSTICE

FOUNDATION

www.ejfoundation.org

ETHICAL FASHION FORUM

www.ethicalfashionforum.com

FROM SOMEWHERE

www.fromsomewhere.co.uk

G=9.8

www.g98.fr

JUNKY STYLING

www.junkystyling.co.uk

LUNAR

www.lunarlife.co.za

MAKEPIECE

www.makepiece.co.uk

MARK LIU

www.markliu.co.uk

MINNA

www.minna.co.uk

MYCOANNA

www.mycoanna.com

NITIN BAL CHAUHAN

nitinbalchauhan@gmail.com

NOIR

www.noir-illuminatiz.com

OXFAM

www.oxfam.org.uk

PEOPLE TREE

www.peopletree.co.uk

PROPHETIK

www.prophetik.com

REVAMP

www.revampfashion.co.uk

STEWART+BROWN

www.stewartbrown.com

ACCESSORY DESIGNERS

AMAZONLIFE

www.amazonlife.com

BEYOND SKIN

www.beyondskin.co.uk

FIFI BIJOUX

www.fifibijoux.com

IGNES

www.ignesbags.com

NAHUI OLLIN

www.nahuiollin.com

NINA DOLCETTI

www.ninadolcetti.com

PIBIONES

www.pibiones.com

SONYA KASHMIRI

www.sonyakashmiri.com

TERRA PLANA

www.terraplana.com

VEJA

www.veja.fr

PHOTOGRAPHER:

Will Whipple

STYLIST: Jocelyn Whipple

HAIR AND MAKE-UP:

Nina Pach at Carol Hayes

Management using

Organic Glam make-up

and Aveda hair products

MODEL: Rosa Curtain at

Independent

This page: Elena Garcia organic satin silk hand-dyed dress; Elena Garcia organic silk wrinkle blouse; Lunar crochet suede belt

Inset: House of Tammam 'Mary' organic cotton jersey tunic with wild peace silk detail; Anatomy 'Day' miniskirt; Sonya Kashmiri 'Loren' bag in naturally tanned leather; Terra Plana 'Opei' shoes





Is turning to 30°C enough? ...OR SHOULD YOU BE USING AN ECO DETERGENT?

Nestling in their brown paper bag, they resemble sticky toffees or Christmas figs. It's hard to believe they are designed to go in a washing machine, but these 'soapods,' made from the shell of the soapnut (which grows in South Asia and other tropical climates) are the latest product to hit the eco laundry market. The shell naturally contains saponins, the active ingredients in soap, and are as natural and renewable as a washing product can get.

So at one end of the eco laundry spectrum

we have some nuts; at the other is a chemical-filled detergent with some energy-saving instructions: 'Do a good turn,' says Ariel. 'Turn to 30°C with Ariel and reduce the energy per wash by up to 40 per cent.' Other brands have added their own 'turn to 30°C' messages, and midway between these two poles is an expanding array of 'eco' detergent brands, but even they can differ in terms of ingredients.

Faced with an increasing number of options, how can we distinguish a green wash from greenwash? Especially when not everyone in the eco arena agrees...

'If you're looking for the greenest wash on the planet, the most significant issue is the temperature of the wash,' says green guru Julia Hailes in her book *The New Green Consumer Guide*. Of 'green' detergent brands such as Ecover, Faith In Nature and Bio D, she says: 'many claim to be better at breaking down in sewerage systems – essentially enhancing biodegradability'. Hailes is not convinced this claim is as significant as the manufacturers make it appear, however: 'If you ask water authorities today, they're no longer greatly concerned about detergent

DID YOU KNOW? It takes 10,000 to 12,000 litres of water to treat every wash using non-ecological washing powder until it is safe to re-enter our water system. Ecover biological washing powder can take less than 4,000 litres for every wash.

waste – they get a far bigger headache from water running off farmland contaminated by fertilisers and animal waste. She recommends buying biological detergents (which contain enzymes ‘pivotal to effective cleaning at low temperatures’) in the most concentrated form you can find (smaller doses cut down on packaging and transport). The implication is that it’s okay to use conventional detergent after all – but is this really the case?

It’s true that turning the temperature dial down does make a big difference – up to 90 per cent of the energy used when washing clothes goes on heating the water. In this sense, Ariel’s ‘Turn to 30°C’ campaign, run in partnership with the Energy Saving Trust, is spreading an important message.

But cleverly aligning a brand with a green message – and brandishing this message on TV ads and packets – does not alone make for an ecologically friendly product. The problem with focusing on temperature is that it obscures the issue of the ingredients.

Conventional powders, tablets, liquids and liquid powders are laden with chemicals – all of which impact on our water system.

‘Chemicals found in conventional washing powders can cause irreversible damage to our water system when they disappear down the plughole,’ says Ecover CEO Michael Bremans. ‘They create an unnecessary burden as more water is required to neutralise their impact, and by polluting our water supply.’

This burden can be understood in terms of ‘critical dilution volumes’, which measure how much water it takes to neutralise each dose of a product. For instance, it takes 10,000 to 12,000 litres of water to treat every wash using non-ecological washing powder until it is safe to re-enter our water system. Ecover biological washing powder can take less than 4,000 litres for every wash. ‘If 5 per cent of UK families switched from a conventional product to Ecover, more than half a million swimming pools’ worth of water would be safeguarded against pollution in a year,’ says Bremans.

So washing with a ‘green’ product can significantly reduce the environmental impact. Even better, at least some of them work well at 30°C or 40°C. When shopping for an ‘green’ detergent there are various things to look for:

■ **Choose products based on plant and mineral ingredients that biodegrade completely.** Most laundry detergents contain surfactants (which reduce the surface tension

of the water, allowing more efficient cleaning). The plant-based surfactants often used in green brands break down in a matter of hours or days. For instance, Bio D say that all their products will have 100% biodegraded within seven days. Commercial laundry detergents contain petroleum-based surfactants, which can take longer to biodegrade and might not do so completely.

■ **Avoid optical brighteners**

Added to detergents, these are chemicals that reflect light, making clothes look brighter than they are. Optical brighteners are made with stilbenes, which can cause allergic reactions when in contact with skin and exposed to sunlight. Stilbene derivatives are suspected endocrine disruptors. Stilbenes are also toxic to fish. Most eco detergents are free of optical brighteners. They won’t make your whites ‘whiter than white’ but at least you can wash with a cleaner conscience.

■ **Avoid phosphates and phosphonates**

Many conventional detergents can contain up to 30 per cent phosphates (sometimes listed as STPP or sodium tripolyphosphate), there to soften the water and help disperse dirt. When flushed into the wastewater stream, they stimulate excessive growth of algae in the rivers, streams and lakes, starving fish and

plant life of oxygen (a process known as eutrophication). Around 11 per cent of phosphate entering surface waters in England and Wales are from laundry cleaning products (the main contributors being agriculture and human sewage). The average UK wastewater treatment plant (i.e. without ‘tertiary treatment’) is unable to remove phosphates from the water, and the relatively small proportion that do use a chemical-stripping process using ferric salts, which are toxic. The process generates large amounts of phosphate-rich sludge, which tends to end up in landfill.

There have been some developments towards controls in the UK, however (a proposed ban on phosphates in household laundry cleaning products by 2015) and a Defra consultation is in progress to tackle the issue. Sweden, Italy, Germany, Switzerland, Norway, Austria and the Czech Republic have all effectively banned phosphates in household detergents. ‘I think that there is a very fair argument that there should be a ban,’ says David Santillo, senior scientist with the Greenpeace Research Laboratories.

But phosphate substitutes can cause problems too. Santillo says there are concerns about phosphonates, found in some ‘phosphate-free’ detergents, due to their toxicity and resistance to degradation. ‘This just goes to show the importance of ensuring one problem is not replaced with another,’ he says. ‘Importantly, there are alternatives that have far fewer impacts.’ Bio D, for instance, uses zeolites which are effectively mineral in nature and have low or no toxicity.

■ **Don’t believe the Ecolabel**

Confusingly, there are brands on the market, such as Aquados Simply Washing, which carry the EU Ecolabel ‘flower’ and yet contain phosphates and optical brighteners. The Ecolabel, which permits the use of phosphates and only requires partial degradability, does not exactly guarantee a high level of green credibility. Ecover and Bio D both say they won’t carry the ‘flower’ as the standards and criteria for carrying it are not high enough. ‘I was offered the Ecolabel 10 years ago but I couldn’t be bothered as I saw no value in it,’ says Bio D managing director Michael Barwell. ‘People are being duped by it. It’s confusing having products like Aquados on the market – I was appalled by their ‘eco-smart’ statement on the tub.’

Go for a brand in the box (left) instead.

Try these

- Alma Win
www.almawin.co.uk
- Bio D
www.biodegradable.biz
- Ecover
www.ecover.com
- Faith In Nature
www.faithinnature.co.uk
- Natural House Organic Soap Flakes (made from organic, plant-derived vegetable oils)
www.natural-house.co.uk

Ultra low-impact options (but don’t expect them to shift stains)

- Soapods (soapnut shells) are natural, renewable and by using them you’re helping to preserve tropical forests, and support rural communities. You can add essential oils to the wash for fragrance.
www.soapods.com
- Ecozone Ecoballs are plastic balls that unleash ‘ionic cleaning power’. Fragrance free and reusable for up to 1,000 washes
www.ecozone.co.uk

How to... cook green

Small actions like not overfilling the kettle and keeping cooking pans lidded are obvious, but is there any more we can do to green our grub? By **Russell Scott**



GAS OR ELECTRIC?

In a straight comparison, it can easily be argued that gas is a better choice than electric. It is cheaper – 3p per kWh compared to 10p – and although it requires slightly more energy to cook the same amount of food, gas produces half the CO₂ of electric. Long-term, however, the choice is less clear-cut. Gas is non-renewable, and while biogas may develop as a potential source for some, major supplies will eventually run out. Alternatives such as wind, solar and hydro produce electricity, making electrical cooking the potential sustainable solution.

AGAs Made from 70 per cent recycled iron, with exceptional lifespans and designed to produce a lot of heat from a little energy, AGAs appear to have many desirable traits for the energy-conscious chef. An energy-consumption comparison, however, presents some problems. First, AGAs are designed always to be on, even in summer. Manufacturers claim savings of 120-185kWh per week (from a reduction in kitchen heating and other appliances such as tumble dryers.) But while gas ovens consume 800kWh of energy a year, the equivalent AGA model consumes 22,100kWh. Even taking into account the highest potential savings, this figure only drops to 12,480kWh a year, still way above a conventional cooker.



Consider the carbon and water footprint of your food choice. Processed food requires more energy and is often contained in energy-intensive packaging. Organic produce uses no oil-derived fertilisers. Think about food miles – do you really need those Israeli new potatoes or will a few British spuds suffice?

Herbs are great for adding flavour to food but rather than using greenhouse-grown, water-intensive, out-of-season, over-packaged 'fresh' herbs, why not grow your own in pots? Bear in mind the hidden or 'embedded' water in food. For instance, figures generally show that beef is highly water intensive –

to produce 1kg of beef requires 15m³ of water, while 1kg of cereals needs only 0.4-3m³. Having said that, accurate figures are hard to come by and this data refers only to grain-fed beef; grass-fed beef has a smaller water footprint. When you do eat meat, opt for higher-quality and locally-sourced produce – you'll be surprised how much more you savour a product that costs a little more.



- **PLAN AHEAD** Allow food to defrost in advance. Cooking from frozen increases energy consumption by 50 per cent.
- **COOK EXTRA PORTIONS** and save them for later. It takes more energy to cook the food from scratch.
- **CUT INTO SMALLER PIECES** This saves cooking time and applies to many meals.

OVEN TECHNIQUES

Cranking up the oven to the highest temperature will not reduce the time it takes to preheat. Try a fan oven instead, which is 20 per cent more efficient.

- By using ceramic or glassware, the temperature of the oven can be reduced by 20°C with little effect on cooking time. These materials retain more heat and cook more gently. Don't use disposable trays!
- Opening the door to check the cooking reduces the temperature by 25°C. Instead, clean the oven so you can see inside. A cleaner oven is more efficient too, as black residue absorbs heat.
- Adding your dessert to the oven will only add 0.25kWh to the energy consumption of the oven.
- Ensure hob sizes match those of the pan.

■ **BOILING WATER IN THE KETTLE FIRST** is more efficient than using the hob as the element is in direct contact with the water, thus removing a stage of energy transfer. Make sure the hobs are clean, too, for the same reasons that a clean cooker is more efficient.

■ **STEAMING VEGETABLES IS NOT ONLY HEALTHIER**, with 90 per cent of antioxidants being preserved, but also a quicker and less energy-intensive method of cooking. Steaming food using the same pan that is boiling the potatoes reduces the number of hob rings used, and thus wasted energy. Save the water and use for gravy or other sauces.

Ancient woodland, the UK's equivalent of the rainforest, now covers less than 2 per cent of our land area, yet supports more globally threatened species than any other UK landscape.

The Woodland Trust is dedicated to the protection of this irreplaceable habitat.



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Conserve

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BEHIND THE LABEL

Sometimes even the greenest of activities have hidden impacts on the environment. **Pat Thomas** explains why eco-minded cyclists should break the chain of lubrication dependence

I know, I know. Every time you think you've gone your greenest, some killjoy comes along and raises the bar a little higher. Apologies in advance.

There are an estimated 20 million bikes in the UK, though it's not clear how many are sitting in a shed in the garden and how many are actually used for regular transportation. In fact, hard facts on bike usage, production, sales, imports, exports and trade are hard to come by, and constantly changing, which means it is extremely time-consuming to assemble statistics and keep them up-to-date.

What is clear is that if you are one of the growing number of people who commutes as often as possible by bicycle, you really are doing your bit for the environment: according to the Worldwatch Institute, a short, four-mile round-trip by bicycle keeps about 15lb of pollutants out of the air we breathe. Bicycles are also more economical to make and run, since, once on the road, they require muscle power rather than fossil fuels to keep going.

Like every kind of vehicle, however, bicycles require regular maintenance to run well and be safe. In particular, your bike chain needs regular attention. An un-oiled chain suffers excess friction and, eventually, from rust, inhibiting performance and efficiency.

We have a lot of bike-riders at the *Ecologist*, so it came as quite a shock one lunchtime when, while doing a bit of necessary maintenance, one of them looked at the label of his can of chain lube to see the words 'hazardous' and 'irritant' alongside a giant black cross on an orange background.

Other brands seen since contain warnings such as 'dangerous to aquatic life', 'dangerous for the environment' and 'harmful if

swallowed... may cause lung damage'.

On any product, such dire warnings should at least cause you to think twice before buying – and using – it.

Out of the frying pan

There are three basic types of chain lube:

■ Spray lubes – thinner, lighter oils that come in spray cans.

■ Wet lubes – slightly thicker for all weather conditions; these cope well in the wet.

■ Dry lubes – usually wax in a solvent mixture, where the solvent dries off to leave wax on the chain.

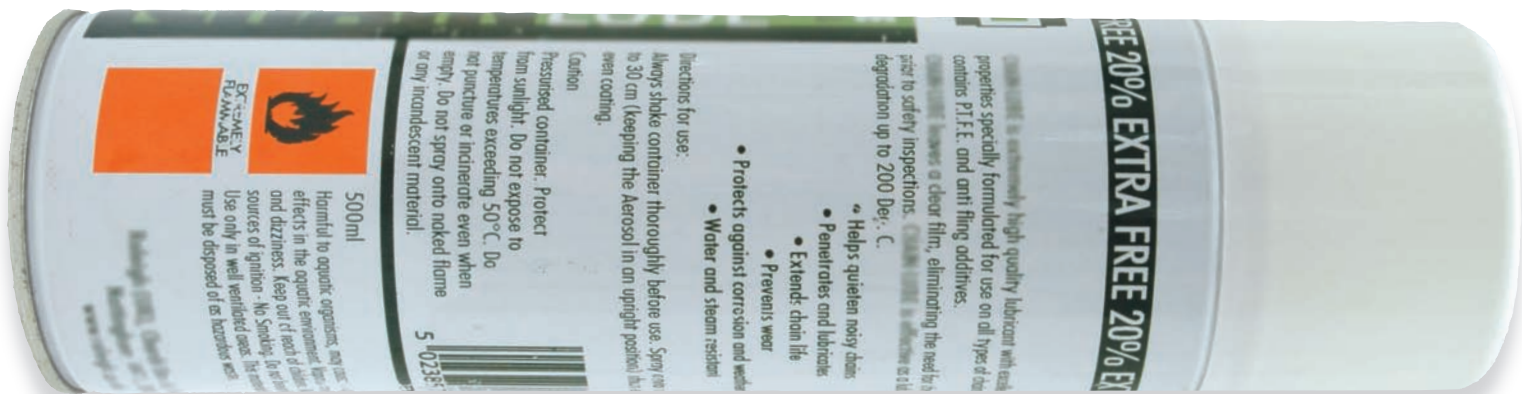
Spray lubes, as the name implies, contain harmful propellants. Spray lubes and wet lubes often contain Teflon (also labelled as PTFE/polytetrafluoroethylene) as well as petroleum distillates. In dry lubes, the wax is usually petrochemical-based, and the solvent, which is also petrochemical-based, can be anything from kerosene (jet fuel) to paraffin.

All of these are ingredients of concern. Petroleum distillates are skin irritants and damaging to the lungs, as are propellants. But it is the Teflon that is particularly worrying.

According to the *Guinness Book of Records*, Teflon is the world's most slippery substance. Most of us associate this waxy, slippery, dirt-, fat- and water-repellent substance with frying pans and cooking utensils, but also stain-proof carpets and clothes, paper products, fast food packaging, spectacles, as insulation on electrical wires and even the fabric roofs covering football stadiums. It's also useful for keeping the wheels on your bike rolling.

Teflon is so useful that for 50 years it completely escaped the scrutiny of environmental regulators.

Chain lube



And then the floodgates opened.

Teflon, which is known chemically as polytetrafluoroethylene, or PTFE, is a plastic-like substance made up of a complex mixture of perfluorinated chemicals (PFCs). Unlike known environmental villains such as DDT and PCBs, PFCs are not generally volatile – in other words, they do not become easily airborne and so tend not to migrate long distances. In addition, to produce a substance such as Teflon, these compounds are usually ‘locked’ into polymers – chains of molecules – so it was assumed that they couldn’t leak into the environment. Even if they did, it was assumed that they wouldn’t break down; and even if they did, it was assumed that they were biologically inert. All of these assumptions are being proved wrong.

Scientific data shows that PFCs fulfil every single criterion for persistent bioaccumulative toxins: that is they do not biodegrade, they accumulate in people, animals and the environment, and they have been shown in laboratory tests to be toxic to mammals.

Although there are nearly 100 known PFCs, only two have been studied in any depth: perfluorooctane sulfonate (PFOS), a breakdown product of the stain-repellent Scotchguard (now withdrawn from sale), and perfluorooctanoic acid (PFOA), a breakdown product of Teflon. Both have been found in the blood of nearly every human tested, as well as in animals in the Arctic and Atlantic oceans.

A toxic trail

Once in the environment, PFCs have been shown to accumulate in organs like the liver, gall bladder and thyroid gland. In primates, including humans, exposure to one of Teflon’s breakdown products, PFOA, has led to an underactive thyroid (hypothyroidism). A prolonged state of hypothyroidism is a risk for obesity, insulin resistance and thyroid cancer.

Laboratory studies also show that PFOA is toxic to at least nine types of cells that regulate immune function. Cells in the spleen and thymus – both critical to immune function – are particularly vulnerable, and humans exposed to PFOA show reduced immune function. Most recently, PFOA has been linked to raised cholesterol and triglyceride (blood fat) levels in factory workers, and in animals to potentially dangerous changes in the size and weight of several important organs such as the brain, liver and spleen. PFOA is also thought to be a hormone disrupter.

In 2005, the US Environmental Protection Agency classified PFOA as a ‘likely human carcinogen’ and asked industry to work towards eliminating PFOA and related chemicals from emissions and products by no later than 2015.

The quickest way to degrade Teflon is through high temperatures. Such is the paucity of research on how it degrades, however, that nobody is entirely sure what else might cause it to break down. Or even how it, and its constituents, get into the environment. Being ‘locked’ in a cookware coating is one thing, but being sprayed on to a bike chain is another. Chain lube is not meant to stay in place for 20 years. With normal wear and tear and friction the lube will come off – even if the product contains glue-like tackifiers (which are also petrochemical-based irritants). Ride on a wet road or through a wet woodland and the lube will begin to wash away into the sewers or on to the land.

Maybe you think the chain lube is not much of an environmental priority, but it’s worth seeing the bigger picture of lubricant oils, which are widely used in manufacturing and mechanical maintenance. It is estimated that 40 per cent of all lubricants are released into the environment. Their ‘proper’ disposal usually includes either burning or being put into landfill, or recycled, each of which has its own environmental impact. Burning releases toxic soot into the air, which is a hazard when inhaled or when it lands on crops or in water supplies, and landfill runs the risk of toxic chemicals seeping into groundwater.

The Environment Agency and WRAP (Waste & Resources Action Programme) are currently

running a consultation on the best ways to dispose of waste lubricant oil (though bicycle chain lube is not included in this consultation). This is primarily concerned with turning used lubricating oils into a cheaper alternative to virgin fossil fuels – lubricating oils are made from waste fuel, so returning them to fuel does complete a cycle of sorts, but it is also energy-intensive and polluting. Recycling is also problematic because of all the additives in lubricant oils.

Alternatives to toxic chain lube are not plentiful. One company, Green Oil (www.green-oil.net), produces a useful biodegradable chain lube made entirely from plant-based ingredients and which is not an irritant, dangerous for the environment or hazardous. The company even goes so far as to use recycled paper for its label, while the bottle is made from HDPE, the same plastic used for milk bottles, so once you’ve run out it can be recycled – provided your local council accepts plastic milk bottles. Alternatively, the company offers customers 20p off their next purchase on returning empty bottles.

So, the bottom line is to carry on wearing those figure-hugging synthetic Lycra cycle shorts if that is your preference (we’ll tackle their environmental footprint another day), but when it comes to bicycle maintenance, maybe it’s time to consider something with a lighter environmental tyre-print.

FACT: In 2005, the US Environmental Protection Agency classified PFOA [the main ingredient in Teflon] as a ‘likely human carcinogen’



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Wi-fi dangers

I have only just begun to read your periodical and was pleased to see the letter relating to wi-fi and phone masts from the very proactive and sensible Jane Gray (*Letters*, July/August).

I live in a house that is no more than 10m from the proposed site of a 3G mast that O2 would like to erect. I consider the proposed location – which is even nearer to other residential properties, in which families with young children and babies live, less than 75m from a large secondary school and directly adjacent to a well-used community playing field – to be outrageous, as do many of the nearby residents of the neighbourhood.

We have formed a community action group and so far managed to amass a substantial amount of support. We are sending letters of complaint and intent to O2 and their consultants in order to voice our opposition to this monster, owing to the dangers to babies, young children and even adults.

I would willingly support her e-petition to our Prime Minister – where do I find it online? I would also be glad of any advice from campaigners who have managed to prevent similar developments by any of the telecommunications giants.

I cannot understand how a government I feel should be fighting to maintain our healthy environments and our freedoms can condone and indeed support this kind of development.

The consequences to current and future generations of children and adults are nothing less than nightmarish to consider. How will the NHS cope when the wounded start getting wheeled into the already overburdened hospitals? Now there's a challenge.

Helen Wardle Baxenden
Accrington, Lancashire

The Editor replies: Jane's wi-fi petition runs until March 2009 and can be found at <http://petitions.pm.gov.uk/school-wi-fi>

Keeping the lights on

The idea that 'the lights will go out' unless we have the Kingsnorth power station or nuclear power is not right. Nuclear power stations and 'clean' coal-fired power stations cannot be built quickly enough to fill the supposed

Taking a wider focus

Simon Fairlie's claim (*Comments*, July/August) that the Government's Foresight Programme is too narrowly focused on science and technology to examine the future of land use in the UK is inaccurate and poorly researched. Foresight's aim, clearly stated on its website (www.foresight.gov.uk) is to strengthen strategic policymaking in government by use of evidence and futures analysis. The mission statement he refers to is several years out of date.

Foresight's brief is far from narrow. Since 1994, it has contributed to a wide range of policy areas as diverse as flooding, obesity and infectious diseases. As well as working scientists, our project draws in economists, lawyers, philosophers, engineers, planners and many others to tackle complex issues.

Our recent report, 'Tackling Obesities' brought together experts, practitioners and policymakers from a wide range of disciplines, including nutrition, behavioural sciences and urban design to consider obesity in the long term. Its findings have challenged the Government to think beyond normal time-horizons to identify enduring solutions rather than quick fixes. For the Land Use Futures project, Foresight will again work with a large and diverse group of experts and stakeholders to address wide-ranging issues, including those relating to social and political influences.

Strategic analysis of the long-term global challenges of a growing world population and increasing pressures on food

'energy gap'. Most renewable sources of power are quick to build, and there are more than enough of them to meet UK needs (see www.mng.org.uk/gh/spreadsheet.html).

The idea that renewables are 'too expensive' is also not right. Although carbon capture and storage (CCS) has not yet been demonstrated in any power station, it is likely that 'clean' coal will prove to be one of the most expensive sources of electricity. When all the environmental and hidden costs are factored in, nuclear power is one of the most expensive sources of electricity (see www.mng.org.uk/gh/no_nukes.htm).

To safeguard against any possibility of a temporary shortfall in electricity supplies:

production goes beyond what our project on land use in the UK will address. I have therefore already commissioned a new Foresight project on the future of food and farming, which will undertake this task.

Professor John Beddington
Government chief scientist

Simon Fairlie replies: Foresight's website states that its second round (1999-2002) would move 'beyond the technology focus of the first round to examine the opportunities that arose from the interaction of innovations in science and technology with wider social and market trends'. However, as a result of a review by Lord Sainsbury, under the current phase of Foresight (2002-) it is considered that 'the programme needed to refocus on science and technology' (see www.foresight.gov.uk/About/Foresight_History.asp)

If, despite the above, Foresight does retain a focus on social and market trends, then that is to be welcomed – but that section of its website needs to be altered.

May I also suggest that the projects on land use and on food and farming take a look at what has happened to Wye College and a number of other agricultural colleges over the past few years?



- The Government should introduce a vigorous programme of 'zero-carbon eco-renovation' of existing buildings as described on www.mng.org.uk/gh/ecorenovation.htm. Germany already has a programme of eco-renovation to bring existing buildings as close as possible to the *PassivHaus* standard.
- Since most buildings are heated by gas, this would mean large savings in the amount of gas that the UK is using for heating.
- If there is a shortfall in electricity supplies, some of the gas saved by eco-renovation may be used for generating electricity.
- Naturally, any gas that is used in that way should be burned in combined heat and power units (CHPs) to make maximum use of

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waste heat from electricity generation.

The Stern report has made it clear that we must start spending money now to avoid much larger costs later. Renewables with energy conservation are the way forward.

Dr Gerry Wolff PhD CEng, by email

Unbearable

While Tom Hodgkinson may have delighted in the 'mind-blowing prancing from the ponies' (*How to be Free*, July/August), did he give even one thought to the lives these unfortunate creatures lead when they are not being forced to perform or being hauled from one venue to another? When I Googled the Giffords Circus website, a photo of a bear was shown in the picture gallery; I can only imagine the hell that bear must endure to provide the likes of the author with temporary amusement. I am a life member of Animal Defenders International, an organisation that works diligently to end the abuse of animals for the sake of entertainment. I purchase the *Ecologist* regularly in Canada and usually appreciate the content, but would trust that, in the future, instead of references to animal circuses such as those espoused by the author, their cruelty would be exposed.

Carol Tracey, by email

The Editor replies: There are no live bears at Giffords Circus. The photograph on its website is of a man in a bear suit. Likewise, we are satisfied that the horses at Giffords are treated humanely and well.

Smart technology?

I was somewhat gobsmacked to see a feature on 'SMART homes' in the *Ecologist* (May). I fail to see how installing devices that increase the amount of microwave frequency radiation and expose the house's inhabitants to damaging microwave radiation 'electrosmog', can be anything other than a nuisance.

Some of the smart devices use wi-fi at 2.4GHz, as featured in a previous *Ecologist*; others a different microwave frequency of 433MHz and will carry with them the same serious potential health problems. Particularly trying to promote their usage for the elderly and infirm is asking for tragedies to occur.

The logic of introducing devices that expend extra electricity in producing a wireless transmission as a way of reducing electricity usage is completely flawed. The article refers to the amount of domestic energy use and its production of CO₂, then effectively goes on to add still further to it.

Wireless devices such as

ECOLOGIST POLL

Q: Are you willing to cut your meat consumption in half for a healthier global environment

73% of you believe we need to rethink and reform the current UK system of education

wi-fi routers, digital cordless (DECT) phones, mobile phones and their chargers, not to mention mobile phone masts, are huge contributors to domestic energy use, and by going back to the wired alternatives, turned off when not in use, you would be making a greater contribution than yet another gadget could hope to achieve.

I suggest instead that you get into a good habit of turning off all your electrical devices when not in use (apart from fridges and freezers). You can use cheap, passive plug-in devices to measure the energy use of each device in your home and decide how much or little you wish to them. This does not warrant constant monitoring, just periodic checks.

Smart meters installed by electricity companies will mean that anybody sensitive to microwave emissions will no longer be safe in their own homes – part of a worrying trend.

Don't get into the flawed mindset of expecting gadgets to do all the work for you. That's part of reason we're in the situation we are in now, after all.

Ade Gray, by email

News editor Mark Anslow replies: You're right to raise concerns over the increasing number of gadgets in our homes, but you seem to have rather misunderstood the thrust of the 'SMART homes' article. Although there's no substitute for actually switching appliances off at the mains and making do with less, many of the devices profiled in Rachel Clode's article help to manage energy usage in ways that are simply

not possible using conventional systems.

Take smart meters. When they are eventually rolled out, they will offer the opportunity for the grid to 'talk' to our home appliances, meaning non-critical devices (e.g. water or space heating) can be switched off in times of peak energy demand. This may not sound so important on its own, but when you consider that preparing for peak demand can mean keeping coal- or gas-fired power plants constantly running just waiting to supply power at the crucial moment, you realise how important it is to begin to use technology to balance our energy demands.

The situation becomes even more crucial when intermittent renewable generation sources are considered.

You also need to be extremely careful when drawing parallels between wi-fi technology and SMART home technology. A 433MHz signal would be a radio signal – not a microwave signal – and the reason that wi-fi signals are thought to be harmful is due to the fact they are rapidly pulsed transmissions, which interfere with the body's cells at close range. The science raising questions over wi-fi does not translate exactly to the low-power domestic switching equipment discussed in the article, though further research may be necessary.

As regards SMART meters themselves, several systems are currently being discussed. SMART meters in other countries have used the power lines themselves to transmit information, though it appears that the UK Government is also entertaining the idea of using wi-fi or mobile phone technology for the same purpose here. We should lobby to make sure this is not the system finally settled upon.

Finally, we must draw a distinction between devices that simply 'use' energy, such as wi-fi routers or DECT phones, and those that save it. A SMART meter is capable of saving millions of times more energy than it uses, and many of the new devices – such as those manufactured by EnOcean – are self-powering, i.e. they draw power from the device they are monitoring.

We are right to be wary of new gadgets, but the fight against climate change will not be won unless we choose to embrace appropriate technologies.

Erratum

In the September issue we incorrectly attributed the review of the *The Green Food Bible* to Phil Moore. The author of the review was George Hackford.

www.theecologist.org/ETV



Now playing The Giriraja Chicken: India's answer to the global food crisis



Control cash **not** people

To blame our social and environmental problems on a population explosion in the developing world is to ignore the real bottom line, says **Asoka Bandarage**

Since the Industrial Revolution, 'overpopulation' has been identified as the major cause of environmental destruction as well as poverty and social conflict. According to the principle of population put forward in 1798 by Thomas Malthus, human population increases geometrically, but, given the scarcity of natural resources, the food supply increases only arithmetically. The resulting 'overpopulation', Malthus argued, leads inevitably to natural resource depletion, poverty and social disorder, and he called for stringent methods of population control among the poor to avert these problems.

Malthusian ideology, which was based on inequality and fear, has been invoked throughout the modern era, especially during economic downturns and social crises. As quantitative reasoning and statistics became the lingua franca, the term 'population' lost its active usage and people came to be viewed as a dependent variable to be managed by a class of scientific and bureaucratic professionals identified with Malthusian ideology.

As global destruction, food scarcity and conflict worsens, calls for population control in less developed countries intensify. Seeing each human born as a 'draft on all aspects of the environment', neo-Malthusians attribute major environmental problems – depletion of the ozone layer, greenhouse gases, acid rain, pollution, loss of biodiversity, deforestation, topsoil, desertification – to increased population pressure. They call for population stabilisation as the urgent solution.

People and the environment are closely interlinked, but the so-called 'carrying capacity' of regions – the relationship between population and resources – is not a static, mathematical one that can be extricated from socio-historical context. It is a complex dynamic shaped by social relations, technologies of production and reproduction, patterns of consumption, religious ideologies and social class and gender relations in particular.

During the early stages of global capitalist development, the European population 'exploded', while non-Europeans experienced

Asoka Bandarage is the author of *Women, Population and Global Crisis*



massive depopulation. The reason for the contemporary 'population explosion' in the global South and decline in the North (apart from immigration) lies in uneven and unequal patterns of global development. Poverty and lack of other sources of security make large families a rational choice for most colonised people, as it has been for many in labour-intensive agricultural societies. Children are economic assets in poor families, not liabilities like their middle-class counterparts.

Although poor women continue to have larger families than educated middle-class women, fertility and population growth rates are today declining far more rapidly in the South than they did during the demographic transition in the West. Fertility in the 50 least-developed countries is expected to decline from 4.63 children per woman in 2005-2010 to 2.5 in 2045-2050. In regions such as Sub-Saharan Africa, population growth rates are also slowing down due to mortality increases associated with poverty, war and AIDS.

Population control by itself does not lead to environmental sustainability or the alleviation of poverty and conflict. Coercive and experimental fertility control can make family planning a force of women's victimisation rather than liberation. Often experimental contraceptive methods, such as anti-fertility 'vaccines' are given without informed consent procedures and quality healthcare.

In many countries in the South, fertility and population growth rates have come down sharply, without significant improvements in standards of living and the social and economic position of women. Research shows that for family planning to be voluntary, economic security of the population and women's access to

material resources, education and healthcare must be available. In regions such as Kerala, in India, and in Sri Lanka, voluntary fertility declines were associated with social welfare and the reduction of social and economic disparities, including social class- and gender-based inequities. In contrast, aggressive family planning in contexts of extreme impoverishment is leading to crisis-led fertility declines among some of the poorest populations in the world today.

Widening economic inequality, not overpopulation, is the critical issue. The 20 per cent of the world's population living in the highest-income countries account for 86 per cent of total private consumption, whereas the poorest 20 per cent account for 1.3 per cent of the same. Clearly, the rich put more pressure on the environment than the poor.

Militarism and the arms trade emanating from the North pose a threat to life and the environment; population control advocates call for timetables and quotas for population stabilisation, but not specific strategies to level overconsumption and economic growth, which would be completely unacceptable to wealthier segments, which would feel robbed.

The greatest threat to the environment is the current model of unbridled economic growth pursued by transnational corporations, industrialised countries and new economic powers such as India and China. A more balanced model of development that incorporates social and ecological criteria is urgently needed. It is necessary to move away from the quantitative focus on population size and growth rates to a more qualitative focus on the right of all to food, shelter, healthcare, education and decent livelihoods.

Contemporary environmentalism too needs to move beyond a narrow Malthusian framework towards a holistic approach incorporating the concerns of social justice and global political-economic transformation.

Sustainable development requires that the purpose of economic production be changed from the pursuit of short-term profit to preservation of the ecosystem and humanity in the long term. It calls for a fundamental transformation of consciousness, from the excessively individualistic and mechanistic approach to an ethical, ecological and democratic approach to life that honours the interdependence and unity of planetary life.



Population control by itself does not lead to the alleviation of poverty, conflict or environmental sustainability. Indeed, it can be a force of women's victimisation rather than liberation

JOSS GARMAN: CURRENTS

Another day, another wonder crop offering green and guilt-free air travel. When will the aviation industry get its head out of the clouds?

Flights of fancy

Last week a good friend of mine who works for an international development charity in West Africa wrote me an email to ask what I thought about jatropha. Ja-what? Well, that was my reaction too. So I did some research and discovered the latest in cutting-edge aviation industry greenwash.

Jatropha is a crop that can be grown on marginal land and is relatively low-impact. It's easy to grow in developing countries because you can grow it in harsh environments such as the Sahel region of Africa, and you could theoretically get a high-value crop for poor farmers. It grows on non-productive land, on laterite (metal-heavy rock) and salt-intruded soils. Better still, it works as a good live fence, because animals don't touch it. My friend was understandably pretty enthusiastic, given that it could provide a low-maintenance, high-energy fuel to generate an income for the impoverished farmers that he works with. The good news, he told me, is that Air New Zealand is trialling it as a biofuel to power its aircraft. Sounds like a rare piece of positive news. Maybe the Royal Commission on Pollution got it wrong when they said credible alternatives to kerosene were years off? No, as so often, the real scientists were right.

In *New Scientist*, David Strahan recently published an investigation into the growing claims from the air industry that new low-carbon fuels for planes are just around the corner. Here's what Strahan found out about jatropha: 'Aviation currently consumes around five million barrels of jet fuel per day, or 238 million tonnes per year. On current jatropha yields – 1.7 tonnes of oil per hectare – replacing that would take 1.4 million square kilometres, well over twice the size of France. To put this in context, D1 Oils, the British company pioneering biofuel from jatropha in countries such as India, Zambia and Indonesia, plans to plant 10,000km² over the next four years.'

And so we face the same old problem. I have little doubt that it is theoretically possible to get a programme growing of certificated, fair-trade, organic, clean-living, community-owned jatropha crops that don't displace food crops; it's theoretically possible, too, to use those happy jatropha oils for biofuel – but it would be because of a market intervention, and not really because the crop was jatropha. You could do the same with palm oil. And just because interventions in the market can create little havens of sustainability, that doesn't change the overall market machine. So, for example, Unilever could

Joss Garman is an environmental campaigner and journalist



have one plantation as 'green' as can be, on reclaimed land, producing a stream of certificated and 'safe' oil to sell to hand-wringing North London liberals to put into their VWs, but all around it could be trashing the forest for cheap palm oil to sell to the Chinese food industry to make however many hundreds of

billions of pots of instant noodles the company makes each year. On a project-by-project basis, jatropha could be fine – but a panacea, it isn't.

Were a big market for jatropha to develop – for the aviation industry or others – it could become profitable enough to interest factory farmers. Before you know it, there's pressure for the conversion of land into plantations, and thence deforestation. After all, in theory palm oil is low-impact and sustainable too – certainly compared to sunflower, rape and olive – until it gets

too high-value and requires vast plantations, replacing peatland and rainforest!

The Advertising Standards Authority slated Ryanair for 'playing down the impact of aviation on the environment', but the new frontier for climate activists is battling the industry's spin that Branson's coconuts, or

the contents of someone, somewhere's Petri dish, holds the key to tackling the unsustainable growth in flying. The reality is that making fewer journeys by air and using electrified transport wherever possible are the only sustainable solutions for our transport needs into the climate-changing 21st century.



Maybe the Royal Commission on Pollution got it wrong when they said credible alternatives to kerosene were years off? No, as so often, the real scientists were right



The wave theory

Environmentalists waste effort and opportunity by not pulling together. A unified movement will create, inspire and sweep all before it, argues **Miguel Mendonça**

During my global travels, spreading the word on the cheapest, most effective and equitable policy road for renewables, my observations and experiences have led me to several infuriating and distressing conclusions. It seems the movement is suffering from an overall lack of strategic, joined-up, big-picture thinking, and is failing to bring the public on board, and so create a more effective political force for positive change. I believe we are greatly in need of a reality check.

My main contention is that the world's efforts towards sustainability and climate-change mitigation are never going to be effective enough overall to get us where we need to go in time. This is due, in part, to a real lack of oversight, cooperation and coordination, leading to slow progress, festering doubt in the public mind, duplication of effort and the wasting of very limited time, money and human resources.

For example, there are many websites and initiatives aimed at knowledge-sharing on policies and practices, but they are not talking to each other. Why not get this coordinated, and at the very least keep each other informed? Researching initiatives on different areas of sustainability takes too long at the moment – why is there not a good web tool for tracking what people are up to? It is not unreasonable to have at least one or two people in the world who make it their job to create a web portal for finding out what is happening around the world on different parts of the problem, i.e. food, water, biosphere restoration, biodiversity, energy, peace, democracy, trade, economics, human rights and so on. Big players with the reach and clout of the UN Environment Programme and Google should already be thinking this.

This is not to call for a one-size-fits-all solution – my work on renewable energy policy has shown me that every jurisdiction designs and implements its own differently, according to local conditions and priorities – but general approaches that have proven successful in terms of policies and practices (like renewable energy feed-in tariffs or a knowledge-sharing website)

Miguel Mendonça is a research manager with the World Future Council



show you can successfully share the essence of a proven solution to a common issue.

What is also problematic is that we tend to work in silos, delivering our projects and aiming to keep funders happy. Organisations, enterprises and individuals become as protectionist as any business or nation. Their work is just as much about internal financial sustainability as environmental sustainability, a factor of how little money people are willing to put into these important activities. So, while it is understandable, it serves to defeat the overall objective of our work.

We must assume that the necessary changes and the urgency of implementing them will not come from business or government in time. Their decision-making processes are self-serving and largely based on their own short-term wants, rather than on the long-term needs of the majority – the common good.

Until we have made this leap, and succeeded in talking to one another more, and having the public behind us, environmentalists cannot construct a global game plan, with a tight timeline – and one so huge it creates a critical mass. Ideally, we need to put ourselves in a position to say to governments and business: 'This is what is necessary, and your voters and customers fully support it. You don't get to block this any more – you either come along with us and work within the new rules set out for the common good, or we swerve around you, and new companies and leaders come forth who understand the times we now live in.'

In this joined-up approach we rely upon ourselves, on our creativity, inspiration and leadership, and on each other. A truly organised global movement, with the citizenry behind it, can have the force of a great river. At present, we are instead

many lone tributaries.

There are now those whose business it is to think about how we communicate with the public. A presentation from Futerra on a recent LEAD International training course highlighted how easily the public turn off. Hence creativity, excitement and fun are vital ingredients in the general messaging: show them the opportunities; show them a better vision of how the world could be.

And not just abstract ideas. Take participatory democracy in some parts of Brazil, for example, where citizens determine a certain amount of local public spending. The results have been astonishing. Frances Moore Lappé's book *Getting a Grip* provides exciting case studies on empowered communities; see especially the chapter 'What Democracy Feels Like'. Giving power and responsibility back to citizens and communities is essential, and we cannot expect active buy-in from an inactive, disenfranchised populace.

Truly to do its job, this great work must answer some of the most vexing questions related to sustainability and equity, especially overpopulation, renewables and energy access, food and water, land rights and so on. My work with the World Future Council has shown me there is already a massive body of work in existence on these things. We already have most of the answers, but the powers-that-be don't do equity, and many citizens in the developing world don't care much for it either. It seems that finding a way of getting enough support to deliver 'deeper green' change is the greatest challenge, especially in times of increasing economic doubt. Will desperation bring more people to our door? Will we be able to create that critical mass before then?

The answer may lie somewhere between society's disenfranchisement, atomisation and lack of faith in politicians and corporates, and people's need to connect, to cooperate, to have fun, to live lives with meaning. We can offer everyone a part to play in the greatest, most exciting journey in human history.

But how to begin? A Facebook group? Large public events? A conference? What do you think? Let us share ideas, and go for it. As the people who do this for a living, it is our job to figure out how to make this world work – and we must show true cooperation, creativity, urgency and leadership in doing so. If this has resonance for you, reader, let us talk.



Without talking to one another more, we cannot construct a global game plan, with a tight deadline – and one so huge it creates a critical mass

RICHARD HEINBERG: POST-CARBON LIVING

Relearning the skills of life before oil will be the only way to help us cope with life after it. We have to get ourselves back to the garden

(Re)discovering (s)oil

It's hard to learn much or do much about sustainability without getting your hands dirty.

True, global problems of resource depletion and climate change entail some high-level thinking. We need to understand some important numbers: 350 parts per million of CO₂ (the atmospheric target necessary to avert catastrophic climate change); 5 per cent production decline rate in existing oilfields (what must be overcome each year to forestall the inevitable peak of global oil output). We need skills in analysis and persuasion.

Inevitably, all of this requires much time spent in front of computer screens. However, while we attend to these technologies and abstractions, we are much more likely to succeed in our ultimate goal of building sustainable culture if we are also grounded in the most basic of activities – obtaining food directly from the Earth.

Reading has taught me a lot. Gardening has taught me as much or more. Often, these lessons tend to be ones that sound trite when put in words: stay humble; don't demand too much too fast; notice the interconnections; go slow, but always pay attention and be prepared for rapid-onset opportunities and problems. When you garden, however, you don't simply learn these lessons verbally and mentally, you learn them with your whole body.

Leaving food production entirely to others is the essence of full-time division of labour, the origin and vulnerable taproot of civilisation. Only in agricultural civilisations has a rigid class system arisen in which the most important

Richard Heinberg is a Senior Fellow of the Post Carbon Institute and author of *Peak Everything*



decisions are made by people who don't need to spend any of their time directly contemplating our human dependence on nature. Instead, the managers, accountants, soldiers and religious functionaries of state societies tend to enclose themselves ever more completely in the language-based social matrix that is the

source of their power. They pay ever more attention to words, money and technology; ever less to weather, birds and insects. And this, ultimately, is why civilisations collapse: the people in charge simply don't notice that the ecological basis of their society is being undermined.

Sound familiar?

There are lots of good reasons to garden these days – given that food prices are soaring and the nutritional quality of supermarket food diminishes by the year. Those of us who are working on sustainability issues have even more reasons to plant and hoe. We must teach our neighbours the survival skills they will need

as fossil fuels dribble away; we must set an example, and help create the gardening networks that will provide food for our communities during the hard times ahead.

Perhaps the best of all reasons to garden, though, is simply our need to stay sane. Yes, the garden is a refuge from a world that often

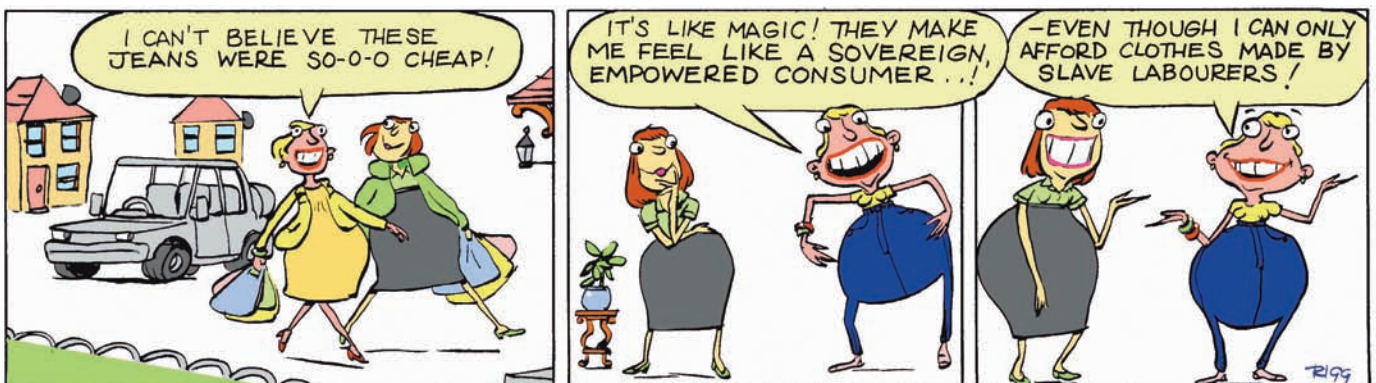
seems to be flying apart – turn off the television and pick up a trowel; you'll feel better – but more importantly, if we garden we are more likely to be psychologically balanced people capable of making sane choices. And the world needs people like that at the moment.



Those of us working on sustainability issues must teach our neighbours the survival skills they will need as fossil fuels dribble away. We must set an example

GOOD BUY WORLD

PETER RIGG



From computer games to biohacking, digital designers are ditching music and video in favour of remastering a more exciting medium...

Life in the mix

If there is a video gamer in your life, chances are that you have heard of Spore, the latest creation from the super successful inventor of 'The Sims'.

Spore lets players digitally design and evolve new organisms ranging from single-celled microbes to intergalactic aliens. In the game, the user can genetically alter their digital life-form, adding body parts one click at a time. The user-created organisms are simultaneously released into the game-worlds of thousands of other players, creating complex and surprising ecosystems to navigate. Spore organisms can be printed on to a t-shirt, mailed to you as plastic figurines or uploaded to 'Sporepedia', an online gallery where fans share their custom-made life-forms for remixing. Bored with editing digital music and digital video, the next nerd frontier is digital life.

As would-be intelligent designers experiment with Spore, the line between remixing digital and biological life is becoming perilously thin. Thanks to the new tools of synthetic biology, Spore fans wanting to dabble in a more organic medium can already do so from the comfort of their laptops. At www.biobricks.org, you can choose among thousands of custom-designed genetic sequences (known as 'standard biological parts') that can be subsequently posted to you as real DNA. One startup, Ginkgo BioWorks of Boston, will soon be offering kits of DNA stuck to paper that enable simple genetic engineering at home. Drop the paper in a test tube with some nutrients and bacteria. Chill it in the fridge and then warm it against your computer screen. Presto! Your bacteria are genetically altered to glow red or smell like bananas. No lab bench or white coat in sight. Just as

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video production moved from a niche profession requiring expensive equipment to today's universe of amateur YouTube clips, so a new generation of synthetic biologists is working to take the elite science of genetic engineering away from Monsanto and give it to the masses as a craft.

They call this DIY genetic engineering 'garage biology' or 'biohacking'. In Boston and San Francisco, amateur biohacking clubs are beginning to form whose aim is to replicate the success of the computer industry in kick-starting an industrial revolution by bringing technology into the home. Synthetic biologist Drew Endy of Stanford University imagines that within a few years there will be a whole new class of life-form designers working remotely from their laptops – emailing their designs to labs just as graphic designers send digital files for printing. Endy runs an annual competition in which hundreds of students and teenagers compete to create the 'coolest' life-form out of standard parts. Right now they 'hack' bacteria and yeast to take photos or secrete biofuels. Within five years, biohacking plants and animals this way will be more common. Futurist Freeman Dyson argues that the coming outpouring of new synthetic life-forms designed by hobbyist amateurs may eventually outnumber those species developed through natural evolution, with engineered life rapidly becoming the norm.



A new generation of synthetic biologists is working to take the elite science of genetic engineering away from Monsanto and give it to the masses

Dyson may be overstating things, but there is certainly a big shift under way that even activists and regulators have yet to comprehend. Despite millions of acres of genetically modified corn and soya, the actual number of new species developed through genetic engineering has so far been a tiny trickle compared to the flood of engineered species our ecosystems may be about to experience. Existing biosafety regulations are already barely able to monitor the health and environmental impacts of that trickle, let alone the results of amateur biohacking carried out in kitchens, bathrooms, garages and via the internet. Unlike computing, the haphazard results of this biological programming will be living, self-replicating organisms. Unfortunately, the digital world doesn't seem to offer much in the way of control solutions. If the DIY organisms of Spore should go awry there is always the option of pulling the plug and rebooting the computer. Out here in the real world, that option doesn't look so attractive.



Ch-ch-changes

Environmental toxins have given us lesbian seagulls and transgender crabs, but pollutants may also be causing gender ambiguity in humans, says **Eric Francis**

For all 17 years I've been writing about PCBs and dioxins, I've been reading about the subtle and not-so-subtle sexual effects of these chemicals and many others related to them. We all have. Whereas once science worried about skin pustules and cancer, today the main concerns about pollution are its effects on sex hormones, and the way they blur the distinctions between the genders. During this same time we've been watching the transgender movement develop around the world – that is, people whose gender identity is consciously shifting, and many who are opting for gender reassignment surgery. Could there be a connection between the chemical and sexual environments?

Since the advent of the Kinsey scale, we have become more accepting of how gender and sexuality exist on a continuum, rather than as an either/or function. Studies on how environmental factors are influencing human gender identity are extremely rare. The topic seems shrouded in the general taboo on sexuality, and the more sensitive issues that surround homosexuality and transgender. Gay and transgender movements, for their part, seem unwilling to ascribe an environmental cause because of the presumption it suggests: that if the pollution is cleaned up, maybe they will go away.

On one level it seems impossible that there can be no connection between environmental factors and sexual fluctuations in humans. The articles on sexual effects of toxins come at us so fast, they go by in a blur. If only we had clipped or bookmarked them all.

Let's see: there were the infamous lesbian seagulls. There were the adult crabs that switched genders. There were the male babies born to Asian PCB exposure victims whose penises were smaller. Sperm counts have declined by 40 per cent since our grandfathers' generation. There was that study about the distance from the scrotum to the anus shrinking in boys, meaning that the male genital configuration is gradually becoming more like the female one.

Exposed girls and women are susceptible to hormonal diseases such as endometriosis. Daughters of Agent Orange exposure

Eric Francis is the editor of planetwaves.net and has covered organochlorines and human sexuality issues since 1991



victims have a higher chance of developing childhood vaginal cancer. The female reproductive system is particularly sensitive to illnesses from exposure, including birth defects and infertility.

In 1991, a group of scientists met in Racine, Wisconsin, to discuss the effects of living in what many describe as a sea of artificial oestrogens, and issued something called the Wingspread Statement: 'The concentrations of a number of synthetic hormone agonists and antagonists measured in the US human population today are well within the range and dosages at which effects are seen in wildlife populations,' the scientists warned.

'Unless the environmental load of synthetic hormone disruptors is abated and controlled, large-scale dysfunction at the population level is possible' – which would seem to imply that social sexual choices and behaviour could be affected by exposure.

'Many wildlife populations are already affected by these compounds,' the scientists continued. 'The impacts include thyroid dysfunction in birds and fish; decreased fertility in birds, fish, shellfish and mammals; decreased hatching success in birds, fish and turtles; gross birth deformities in birds, fish and turtles; [...] demasculinization and feminization in male fish, birds and mammals; defeminization and masculinization of female fish and birds; and compromised immune systems in birds and mammals.'

Five years later, Theo Colborn, Dianne Dumanoski and John Peterson Myers came out with the book *Our Stolen Future*, establishing that hormone effects were not only well-documented, but also subtler and

more widespread than anyone had anticipated. A major federal study on the toxicity of dioxin in the mid-1990s concluded the same thing: hormone effects

are what is the most devastating to humans and wildlife.

In these same years, what used to be the lesbian and gay movement grew into the lesbian, gay, bisexual, transgender and queer movement (LGBTQ), which now seems to embrace everything but heterosexuality and self-sexuality.

We've gone a bit past David Bowie's idea of being 'not sure if you're a boy or a girl'; by one estimate, there are as many as 40,000 post-operative women currently living in the United States. Because health insurance pays for these surgeries in some places, sex changes are considered by some to be normative sexual behaviour. On web meeting spots like craigslist.org, phrases such as FTM (female-to-male transsexual) or MTF (male-to-female), pre-op and post-op are now common parlance.

Safer surgery, easier availability of the procedures and changing psychiatric definitions have helped raise the visibility of transsexuals. Hormone treatment is more easily available for those who wish to take on secondary characteristics of the other sex. Greater social acceptability has also made it easier – 20 years ago you might have been put on a psych ward for being a man who feels and acts like a woman. Today, you can get a date. But is there a reason this is happening now?

'If you see the gender configuration changing in fish and alligators in swamps, and you think that people have been exposed to the same detergents and compounds for years, we seem to have an issue,' said Monona Rossol, a New York-based industrial hygienist. 'The gay movement may be a chemically induced movement.'

Hormones contain the information not only about how our primary and secondary sex characteristics are supposed to look, but also about how we feel being male or female. We all contain attributes of both genders, nevertheless many argue that gender, gender role and sexual orientation are generally polarised more vividly by cultural mandates than by how we feel inside.

This is the viewpoint taken by Lynn Conway, who is one of the world's leading transgender activists, as well as one of the world's most prominent computer

Continued on p88



We've gone a bit past David Bowie's idea of being 'not sure if you're a boy or a girl'

Continued from p87

engineers. She transitioned from male to female in the late-1960s.

'Trans-expression is not increasing,' she wrote in response to an email inquiry. 'What's happening in the West is that we are now revising the social contract that has prevented such expression in the past. This is happening under the pressure of a trans-revolution in which such folks are demanding their rights and aren't going to go away till they get them.'

She adds: 'The numbers here are simply a visible emergence of what's always been there, but has been brutally suppressed and kept invisible in the past. You can see this by looking at the numbers of trans people among Native Americans and, for example, the *hijra* in India. In such societies, transgender people way outnumber (on a percentage basis) the numbers of transitioners here. They simply worked out their social contracts long ago.'

'It is possible that environmental factors may cause various conditions,' she concedes, 'however, there is no evidence that the emerging numbers here are any higher in percentage [terms] than have always existed in India and among Native Americans (approximately 1 to 2 per cent of people). Thus any environmental causes are likely to be small or modest compared to the natural

variation in gendering seen in humans all around the world.'

However, says Carol van Strum, a pesticide expert and author of *A Bitter Fog*, the groups Conway is talking about 'are poverty-stricken to say the least, and are most likely to have very poor diets, heavily weighted toward cheap and highly contaminated foods, which, combined with malnutrition, are almost a guarantee of toxic effects. Add to this a possible cultural encouragement of transgenderism and there is simply no way to compare those groups with Americans or Australians or Chinese or whatever.'

'Maybe there are more gay and transgender people because there are seven billion people on the planet,' says Dana Beyer, a male-to-female transgender medical doctor and surgeon, 'and maybe there are more because of more endocrine disruptors. Very few people are looking at the issue.'

In 2005, with colleagues Dr Scott Kerlin and Dr Milton Diamond, Beyer presented a paper to the International Behavioral Development Symposium delineating the impact that the anti-miscarriage drug DES has had in causing intersex and transgender variations in humans.

'Hormones are signal transducers that impact multiple systems,' says Beyer. 'One day

we will know what biochemical pathways are involved in becoming a lesbian. At the moment we don't know for sure, but we're close.'

'Endocrine disruptors as a general class do cause variations in gender identity and sexual orientation through exposure *in utero*,' she explains, but adds: 'To me it's not the answer: it's part of the picture. We existed long before any of these endocrine disruptors existed.'

This may be true, but that does not deny a trend toward increasing gender-bending on all levels. If a whole population is increasingly affected to the point of increasing transgenderism in many people, then the ultimate result is a severely weakened species, reproductively speaking.

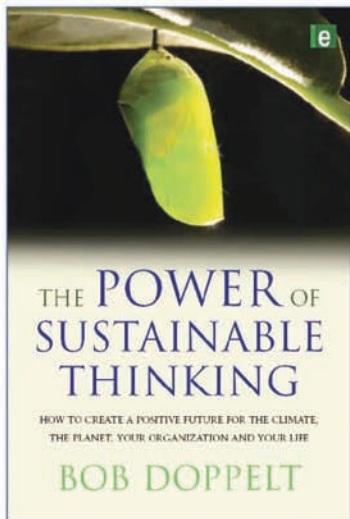
If, within a population, there are such visible and obvious effects as transgenderism, what are the concomitant less visible, less obvious and perhaps more serious insidious effects? For example, behavioural changes due to hormonal imbalance that make a population generally more violent, or brain chemistry alterations that lower the intelligence, judgement capability and adaptability of a population?

The visible effects such as transgenderism are ominous not in and of themselves, but because they signal far more serious effects that are going undetected.

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*Daddy, what did YOU
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Non-action in action

How can we dig ourselves out of the hole we're in when it's the digging that got us here in the first place? **Tom Hodgkinson** downs tools with his Do Less campaign

From all sides, the cry is the same: something must be done. More must be done. Don't just sit there, do something. Action must be taken to avert disaster. Whether you are on the side of the environmentalists or the leftists or the big businesses or the governments, all are agreed: action is necessary. The disagreement comes when deciding exactly what sort of action is required.

Did it not occur that maybe it is the doing itself that is the problem? It is humanity's restless need to intervene, change things, make things, build towers, invent plastic toys, charge around the planet in motor cars and aeroplanes, conquer, plunder, steal, convert, help out, drop bombs, make profits – it is the very doing of these things that causes all the disasters. Aid work is a case in point, as Paul Theroux points out: 40 years of intensive aid programmes in Africa and things have only grown worse.

And it is action and movement, in the form of oil, that is draining the planet. If only we could learn to sit still and contemplate then we

would do no damage. We would consume nothing and we would not be consumed. Lying in a field gazing at the sky is a huge pleasure; it costs nothing and is supremely environmentally friendly. It hurts no-one. 'Doing' itself is a kind of vanity: we do things in the hope that other people will see us doing things and believe us to be good and useful human beings.

It is for those reasons that I propose a national Do Less campaign. Do Less means simply that: whatever you do, just do less of it. That means less work, less travel, less going out, less shopping, less scurrying around, less television watching. Instead of filling every Saturday with pointless shopping trips, just stay at home, do nothing and buy nothing.

Doing less, apart from helping to heal the planet, will also help to heal our souls. Doing less means more staring out of the window, more reading, more storytelling, more sitting around the fire, more interaction with nature, more conviviality.

The beauty of Do Less is that it is so very easy, so very enjoyable and so very useful. When you do less, everybody gets a break. It is also a huge

money-saver: start doing less and you will need less money. Need less money and you will need to do less unpleasant work.

The beauty of the Do Less campaign is that it is strictly anti-fanatical. Fanaticism of any form is wrong because it is an arrogance, whether it is Muslim fanaticism, free-market fanaticism, environmental fanaticism, atheistic fanaticism. Fanaticism is the idea that your ideas are best and therefore you should impose them on other people, by coercion, persuasion or even military force.

The philosophy of doing less – or even better, doing nothing at all – is nothing new. In a sense, it is simply Taoism, the ancient Chinese wisdom that preached non-activity and the idea of *wu wei*, meaning literally 'without action'. Do nothing, say the Taoists, and good will prevail. The *Tao Te Ching*, Taoism's central text, is supposed to have been written in around 500BC by Lao Tzu, a contemporary of Confucius. His idea is that things sort themselves out and we should leave each other alone:

The further one goes, the less one knows.

In fact, the idea of non-action is common to the mystical edges of all religions, whether we are talking about the pleasure-loving amoral mystics of Sufism, the crazy Catholic saints, the Zen Buddhists or even the Protestant mysticism expressed by the 18th-century English writer William Law. All these wise traditions say that the outward show of piety – in other words, 'look at me, look at how holy I am' – may simply be an arrogance. It is not in the doing, says the 12th-century German mystic Meister Eckhart, but in the being that liberation exists.

People should think less about what they ought to do, and more about what they ought to be. Do not imagine that you can ground your salvation upon your actions; it must rest on what you are.

Do Less is an even more Taoist version of Taoism, and an easy path to follow, because how much you do or do not do is entirely your own decision. There will be no Do Less police handing out fines for people who do too much, though you can buy the t-shirt from *The Idler's* website. If you can be bothered.

Tom Hodgkinson is the editor of *The Idler* and author of *How to be Free* (Hamish Hamilton, £14.99)



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