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CHASING SHEEP NOT DRAGONS

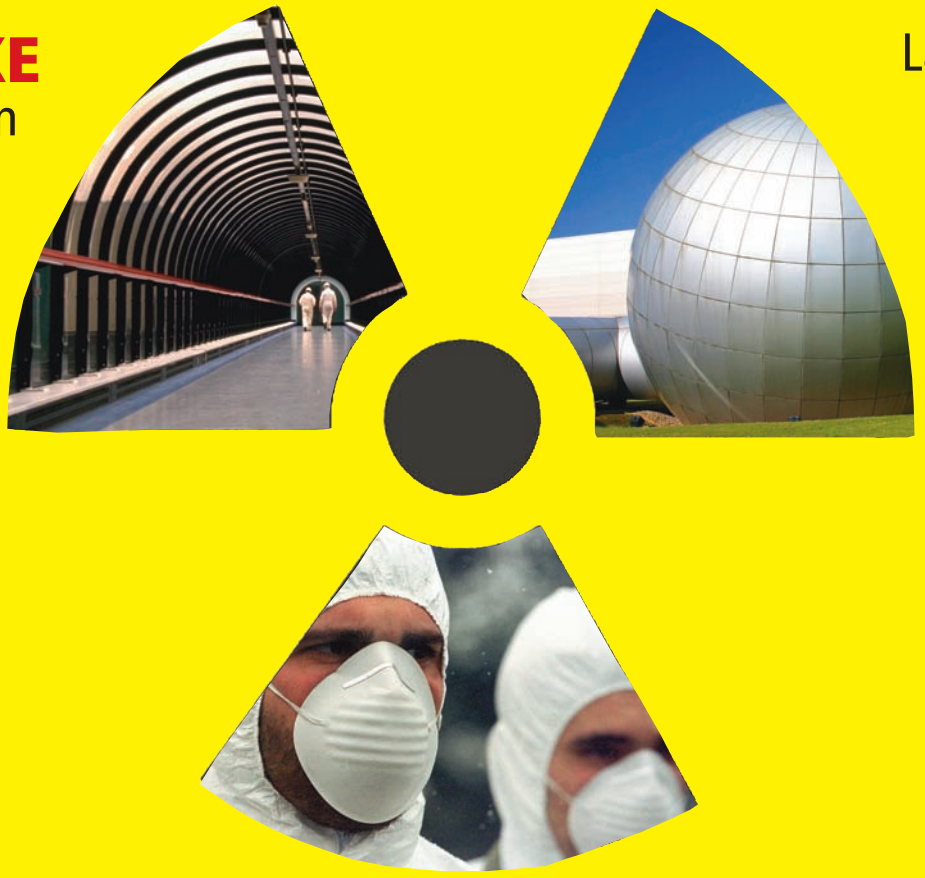
...getting teenagers off crack and into farming

SKATING ON THIN ICE

Last days of the Inuit

DIET COKE

What's not on the can but should be



NUCLEAR POWER

IF IT'S THE ANSWER TO CLIMATE CHANGE AND ENERGY SECURITY, WHY NOT?

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PLUS 37 PAGES

... TO HELP YOU KICK YOUR SUPERMARKET HABIT Food hero – Tom Beaston and his fight to stay local; Sunscreens – cover up don't cream up; community orchards; organic and bio-dynamic wine club; sun-powered showers

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JUNE 2006 | ISSUE 5 | VOLUME 36

FEATURES

41-57 THE NUCLEAR DOSSIER

Think nuclear power and you probably think of small amounts of highly radioactive material, safely encased in vast concrete bunkers, generating an endless and constant supply of clean electricity. Yes it's expensive and clearly there is a problem with waste, but if it is the answer to climate change then why not?

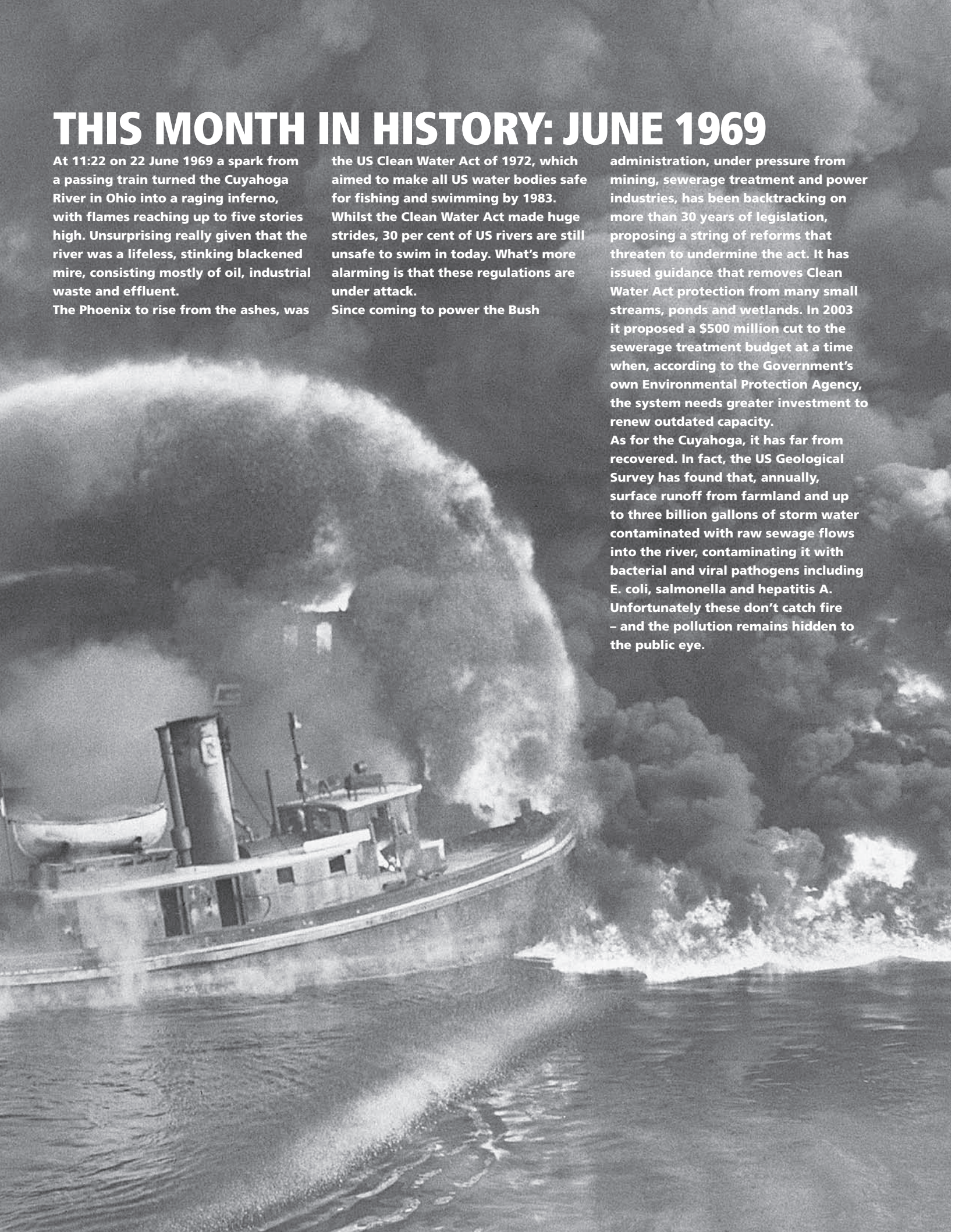
Jon Hughes investigates

COMMENTS

REGULARS

37 PAGE GREEN GUIDE

THIS MONTH IN HISTORY: JUNE 1969



At 11:22 on 22 June 1969 a spark from a passing train turned the Cuyahoga River in Ohio into a raging inferno, with flames reaching up to five stories high. Unsurprising really given that the river was a lifeless, stinking blackened mire, consisting mostly of oil, industrial waste and effluent.

The Phoenix to rise from the ashes, was the US Clean Water Act of 1972, which aimed to make all US water bodies safe for fishing and swimming by 1983. Whilst the Clean Water Act made huge strides, 30 per cent of US rivers are still unsafe to swim in today. What's more alarming is that these regulations are under attack.

Since coming to power the Bush administration, under pressure from mining, sewerage treatment and power industries, has been backtracking on more than 30 years of legislation, proposing a string of reforms that threaten to undermine the act. It has issued guidance that removes Clean Water Act protection from many small streams, ponds and wetlands. In 2003 it proposed a $500 million cut to the sewerage treatment budget at a time when, according to the Government's own Environmental Protection Agency, the system needs greater investment to renew outdated capacity.

As for the Cuyahoga, it has far from recovered. In fact, the US Geological Survey has found that, annually, surface runoff from farmland and up to three billion gallons of storm water contaminated with raw sewage flows into the river, contaminating it with bacterial and viral pathogens including E. coli, salmonella and hepatitis A. Unfortunately these don't catch fire – and the pollution remains hidden to the public eye.

ecologist
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PHOTOGRAPH BY **CORBIS**

EDITORIAL

It may be the standard indicator used by governments across the developed world to measure progress – but most people now accept that GDP does nothing of the sort. GDP is an indiscriminate measurement of economic activity. It adds up the good activity and it adds up the bad activity. It makes no distinction.

If GDP represents progress, then we can have all the progress in the world and it won't contribute one jot to the nation's general well-being. But what would? Clearly any number of factors enhance or undermine well-being. Family, friends, neighbourliness, job security and so on are high on the list. But so too, according to an extensive survey, is politics – or more specifically democracy.

The conclusions of a two-year study into the effects of different political systems on general happiness have revealed that the shorter the distance between people and power, the more involved people are in the decision making process – the happier they are. The study – based on data from 6,000 residents living in the 26 different 'cantons' of Switzerland – is the first of its kind, and it's hard to argue with the findings.

Central to the Swiss system of democracy is the right of its citizens to call a referendum on any subject they want – providing they attract a minimum of 100,000 signatures. With enough support they can block or initiate legislation. Over the years there have been numerous votes – on the movement of freight through the Alps, on GM foods and so on. In1990, for instance, there was a referendum on a proposal for a 10-year moratorium on the construction of nuclear power plants in Switzerland. Despite the pro-nuclear stance of business and the establishment, the public voted by a 55 per cent majority in favour of the measure.

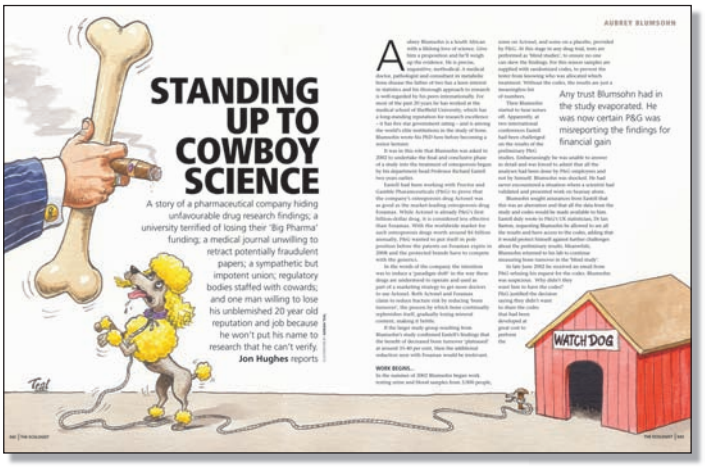
But the Swiss political system is also highly decentralised, with each of its cantons enjoying varying degrees of autonomy from the federal government. Citizens of some cantons are able to directly run their own affairs with a great many opportunities to initiate referendums, while citizens of others are more restricted. The effect is that Switzerland provides the perfect model for comparing and measuring the impact of democratic involvement on well-being.

According to the study's authors, Professors Bruno Frey and Alois Stutzer, the impact is vast. 'Happiness not only depends on economic factors,' they write, 'but also on how well developed democracy is. [Our] study's main finding establishes political participation as an important determinant of citizens' well-being.' It's not simply that in such a system political decisions tend to better reflect the dominant view of the people – the act of getting involved in decision making is itself a major contributor to satisfaction.

Indeed, according to Richard Layard in his new book, Happiness, 'it turns out that people are much happier where they have more rights to referendums. If we compare those cantons where these rights are the most extensive with those where they are the least extensive, the difference in happiness is as great as if they had double the income.'

There's been a lot of talk about decentralising the political process here in the UK. A recent report by the Power Commission actively promotes the idea of Swiss-style Direct Democracy. Such a move would not only reinvigorate our politics – ensuring much needed and much better informed debate. It would also, apparently, make Britain a happier, more balanced nation.

letters



SELLING SICKNESS

At 90, my mother-in-law was very fit and well, going on trips abroad with her friends, going to night school and so on. She then had a visit from her GP because she had not been to see them for over 40 years and they wanted to know if they could improve her health!

She was told she had high blood pressure and a little fluid in her legs. This was untrue. She did not have high blood pressure because, as a state registered nurse, I had tested this for her when she visited us here in France.

She was prescribed aspirin for no good reason, with its documented serious and fatal long term side-effects – brain haemorrhage etc, due to the reducing of platelets – including blood disorders.

A diuretic (Modurate 25), which also is documented to cause blood disorders that are precursors to cancers, diabetes, kidney damage, confusion etc, plus many other serious and fatal side-effects. These drugs should NOT be prescribed just for a little leg fluid and should be prescribed with particular care in elderly people – as with all drugs.

Antidepressants to make her sleep, which are also documented to cause blood disorders, cancers, confusion, dizziness etc. The elderly often do not need as much sleep and should not be drugged to make them sleep.

She became confused and unwell and reported this to the doctor who told her to keep taking the drugs and come back next year. At this point my husband, her son, asked the doctor how much he was being bribed to wrongly prescribe his mother. The doctor reduced the diuretic.

A fall sent her into hospital recently, where she was diagnosed with megeloblastic B12 deficiency anemia, kidney damage, cancer, and many other side-effects of the drugs.

A different doctor then said she had never needed all the drugs at all (which is what my husband had pointed out to her doctor five years ago) and on withdrawal all her confusion, memory loss etc resolved immediately.

It was nothing to do with her age as the doctors had tried to say. She is now so damaged by the drugs she will never recover, and is reduced from being a healthy independent woman to a wreck in a nursing home.

When we pointed out that ALL her health problems had been caused by drugs she never needed, the medics just shrugged their shoulders.

The medical profession has a lot to answer for: selling out to the international pharmaceutical industry, deliberately wrongly diagnosing people with conditions they do not have to sell them more drugs and accepting all the bribes they do to overprescribe and not report side effects. As a group of MPs recently said, the medical profession and drug industry are 'disease mongering' to sell more drugs.

An old French proverb says 'Most men die of their medicine not their illness'.

Patricia Priestley
(State Registered Nurse)
By email

QUICK DEFRA STORY

A Somerset farmer I interviewed told me about a phone call she had from DEFRA. She'd sent in her annual accounts and the guy was unhappy about some inconsistencies. He wanted to know how she had started the year with 50 sheep and ended with 80, when there was no record of any livestock being purchased. 'I had to explain about breeding,' she said. He was pretty embarrassed.

James Russell
Bristol, England

SMUG MUMS

Well, good for you, Emma Christy (No excuses! Just breastfeed, letters (*Ecologist* May 2006). You have successfully breastfed all your children. What a shame, then, that your letter displays not a shred of human compassion or understanding for the problems facing many mothers who would love to be able to breastfeed but, for any one of a number of reasons, are unable.

Send letters for publication to: Letters, The Ecologist, Unit 18, Chelsea Wharf, 15 Lots Road, London SW10 OQJ. Email: editorial@ theecologist.org. The Ecologist reserves the right to edit letters as necessary.

My son is now nearly a year old. Before I gave birth, I had grand plans for a 'normal' labour and I was determined to breastfeed. I'd done my homework, read the facts and figures and never for one moment doubted that I'd be able to breastfeed. However, complications dashed my hopes for a 'normal' birth and an emergency caesarean left me battered and bruised, both physically and emotionally.

Even more upsetting was the fact that, no matter how hard I tried, my son and I just couldn't seem to get the hang of breastfeeding. Breastfeeding is natural, but you overlook the fact that babies are not born instinctively knowing how to feed and women do not automatically know what to do. During the five days I spent in hospital following the birth, the right help and support was not forthcoming.

When we left hospital, I persevered for six emotionally draining weeks and had to express milk throughout that time. In spite of seeking advice from midwives and health visitors, I was left feeling unsupported and alone in my bid to breastfeed. My milk slowly dried up so that I had no choice but to switch to the formula variety.

I have met some seriously unsympathetic women whose smugness about breastfeeding made me want to crawl under the nearest stone. None of them match the level of self-righteousness your letter conveys. Your narrow view of motherhood ignores the fact that every woman's experience of pregnancy and childbirth differs and not everyone is fortunate enough to avoid medical intervention or to be able to breastfeed.

Yes, of course there are a number of women who simply do not want to breastfeed. Ultimately, it is their choice. What about those women who have to return to work after only a short break? You speak from your own experiences and they will differ wildly from others.

As someone who professes to care about the world around them, it seems odd that you should be so callous towards others. Your letter is hardly a good advert for women who breastfeed. Imagine if you had not been able to breastfeed. How would you feel? Devastated, I imagine. The world is not black and white. Why not try to pass on your experiences in a useful way? Hospitals are desperately short of staff who can help with breastfeeding support. Get out there, be a breastfeeding counsellor, do something positive to aid the cause of breastfeeding and stop judging others without any thought to the possible reasons behind them not breastfeeding.

Jo Sharp


BREASTFEEDING

SUCK ON THIS

The human species has been breastfeeding for nearly half a million years. It's only in the last 60 years that we have begun to give babies the highly processed convenience food called 'formula'. The health consequences - twice the risk of dying in the first six weeks of life, five times the risk of gastroenteritis, twice the risk of developing eczema and diabetes and up to eight times the risk of developing lymphatic cancer – are staggering. With UK formula manufacturers spending around £20 per baby promoting this 'baby junk food', compared to the paltry 14 pence per baby the government spends promoting breastfeeding, can we ever hope to reverse the trend? **Pat Thomas** uncovers a world where predatory baby milk manufacturers, negligent health professionals and an ignorant, unsympathetic public all conspire to keep babies off the breast and on the bottle.

"There can be no food more locally produced, more sustainable or more environmentally friendly than a mother's breastmilk, the only food required by an infant for the first six months of life. It is a naturally renewable resource, which requires no packaging or transport, results in no wastage and is free."

LIES, DAMN LIES AND LABELLING

I recently looked at the labelling on a packet of Tesco value roasted salted peanuts to see just how much salt they contained. To my surprise, then horror, I learned from the normal list of contents that the peanuts contained 0.3g per 100g of sodium, but an extra notice further down the label said that this was equivalent to 0.8g salt per 100g. How can they get away with what looks like an understatement of the level of salt in the product? Is it that they have discounted the weight of the chlorine in the sodium chloride? Is this a common practice? Can I trust any labelling?

Les Mitchell
By email

RAINFOREST SAVER

I thought that your readers might like to know that following Daniel Elkan's inspiring article last year (Rainforest Saver, *Ecologist* February 2005) about the vital work of Mike Hands to help save the rainforest and give peasant farmers a more sustainable livelihood, a support group has been set up to support this process. Anyone wanting to find out more should visit the website www.rainforestsaver.org.

If any of your readers are planning to visit the Eden project this summer, they might be interested to know that a sponsored walk to it is being organised on behalf of Rainforest Saver on Sunday 27th August. The walk is from a camp site six miles away, so it is suitable for families with children aged 10 or over, and means that you can approach Eden in a pleasant, environmentally friendly manner in the morning, and have a look round the amazing project in the afternoon.

There you will be able to see some of the Inga plants that have so much potential to help save one of our most precious, beautiful and vital habitats. If anyone would like more details of the walk, please contact Charles Barber at charles.barb@tiscali.co.uk.

Charles Barber
By email

STOP SHOPPING

I am sick and tired of new schemes that try to value the environment and human life in economic terms! Schemes like RED, well meaning as they may be, are pointless as they only tackle the effect, not the root, of the problem at large.

Consumerism needs to be reduced, not encouraged in order to help save a poor African child by buying a pair of Bono-style Armani sunglasses with your RED American Express credit card.

Mattias Dahlstrom
Swansea, Wales

MAY ISSUE OMISSION

In the last line of the photostory, 'We weren't soldiers' in the May *Ecologist* issue, the full website address should read: www.petitiononline.com/AOVN

2004 ivory seizure shipped from Singapore and seized in Thailand

PHOTOGRAPHS BY **IFAW**

ILLEGAL IVORY TRADE STILL THRIVING

Hong Kong customs officials have seized 3.9 tonnes of ivory tusks from endangered African elephants – the largest seizure in Hong Kong since the international trade of ivory was banned by the UN Convention on International Trade in Endangered Species (CITES) in 1989. The haul, according to conservationists, signals the growth of the illegal underground ivory trade that threatens elephants worldwide.

'It is clear that the global community just doesn't have the capacity to enforce either the trade, or the protection of elephants,' said Dr Joth Singh, director of wildlife and habitat protection with the International Fund for Animal Welfare (IFAW). 'IFAW is outraged that massive illegal ivory hauls of this size continue to be trafficked internationally despite the ivory trade ban.'

Some CITES' member nations, led by Japan and South Africa, continue to push for the lifting of the ban and a resumption of trade. Three southern African countries, South Africa, Botswana & Namibia, were granted permission by CITES in 2002 to sell 60 tonnes of ivory stockpiles, despite widespread opposition by many governments and NGOs. The sale is dependent on certain conditions being met, such as effective monitoring of the illegal killing of elephants and proper trade controls. The CITES Secretariat is meeting in October this year and conservationists fear a decision allowing the sale of the stockpiles could be made then.

China or Japan are the most likely buyers of the one-off sale. An independent study released in June last year revealed that China had a large and uncontrolled ivory black market – and were therefore unsuitable importers of the southern African ivory.

■ For more information visit **www.ifaw.org**

> Nuclear power is neither the answer to modern energy problems nor a panacea for climate change challenges.
>
> Mikhail Gorbachev, former Soviet President, speaking on the 20th anniversary of the Chernobyl nuclear disaster.

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TRILLION DOLLARS

is according to the new 'eco-nomics' derived from UN-backed studies, the 'value' of the world's ecosystems. Though a more persuasive argument exists that, since all life would cease to exist without it, nature is inherently priceless.

FDA SUED OVER MERCURY FILLINGS

An Illinois woman has filed suit demanding that the US Food and Drug Administration either prove mercury tooth fillings are safe or ban them. Linda Brocato of Prospect Heights, Illinois, is convinced mercury-containing fillings caused her to develop multiple sclerosis, the symptoms of which improved when she had the fillings removed.

The suit – filed on behalf of Linda, a California dental board member and an Arizona state senator, and others – says that while the FDA has banned mercury in disinfectants and veterinary products and warns against mercury in fish: 'We fail to understand why the FDA ... continues to allow its unregulated use inches from a child's brain.'

IS THIS ANIMAL A THREAT TO NATIONAL SECURITY?

The US Department of Defense is funding a studying into a tiny, ocean creature known as the opossum shrimp. The study is seeking to establish reliable techniques for monitoring the movements of the tiny crustaceans as they conduct their daily round-trip migrations from the shelter of the ocean floor to the waters above. Apparently these daily migrations seriously interfere with the sonar equipment used by the military for detecting and identifying underwater mines.

PHOTOGRAPHS BY **NATURE PICTURE LIBRARY/KIM TAYLOR**

NANOTECH DANGER SIGNS

Not much is known about the ingredients in Magic Nano, a household glass and tile sealant sold, until recently, in Germany. According to the German Federal Institute for Risk Assessment (BfR), Magic Nano was recalled by the manufacturer, Kleinmann GmbH (a subsidiary of Illinois Tool Works) in March after 97 people who reportedly used the aerosol spray claimed to suffer from health problems. These ranged from trouble breathing to six cases requiring hospital treatment because water had accumulated in the lungs (pulmonary oedema).

German doctors propose that, once in the lung tissue, the combination of nano-particles and propellants disrupt the function of the alveoli and bronchial tissue and, by extension, oxygen and moisture exchange and it is this disruption that leads to water in the lungs of some patients.

The recall underscores how poorly regulated the nanotechnology industry is. Once in the body, nanoparticles – which are below 100nm (nanometres) or about 1/ 80,000 the width of a human hair – can easily slip in and out of body tissues and go undetected by the body's immune system. Nanoparticles of 70nm can enter the lungs, while a 50nm particle can enter cells and a 30nm particle can pass through the blood/brain barrier. Because these particles behave in ways that defy the laws of classical physics, regulators admit to being unsure how to test or even establish safety standards for them. However, this hasn't stopped more than 200 'nano' products hitting the market.

WHAT WE LEARNED LAST MONTH...

■ A 'Robin Hood' gang, dressed in pink catsuits and sporting names like 'Spider Mum', 'Santa Guevara' and 'Multiflex', are feeding Hamburg's poor by plundering the city's most expensive restaurants and gourmet delicatessens. The gang strike so rarely and so professionally that police find it impossible to catch them.

■ **Wild turkeys are interrupting the flow of traffic at busy intersections in central Illinois. Animal control officers aren't sure if it's the warmth radiated from the tarmac or some other attraction that makes the birds want to lie down in the middle of the road.**

■ A German marine biologist is carving out a new sideline by developing wine made from seaweed. The 16 per cent proof wine, which sells for £15 a bottle, is made from the brown laminaria saccharina seaweed, tastes like a fine sherry and, says the scientist, contains many minerals, salts, vitamins and proteins that makes this particular wine extremely healthy and boosts the immune system.

■ **Bottlenose dolphins share the human ability to recognise themselves and other members of their species as individuals. Scientists studying dolphins in Florida's Sarasota Bay have found that dolphins develop a distinctive signature whistle – the dolphin equivalent of a name – in the first few months of life.**

■ The US military, short of buglers who can play taps at military funerals, has ordered 700 automated digital bugles at a cost of $500 each.

■ **A dry spell in New Mexico may have forced desperate Santa Fe prairie dogs into the trees to find food and moisture, even though the animals aren't equipped for tree climbing. They don't have the knee locking mechanism to run down trees without falling.**

■ A farmer in Brazil pleaded guilty to killing a 73-year-old nun. The farmer had been paid by two ranchers to shoot the nun after she attempted to stop the ranchers from clearing a section of rainforest.

■ **Canadian scientists confirm that an odd-looking bear shot and killed in April was a 'grolar' bear (half polar bear, half grizzly), thus exempting the hunter who shot the bear from paying a grizzly killing fine.**

'RED LIST' PAINTS BLEAK PICTURE OF EXTINCTION

Two out of every five species on the planet that have been assessed by scientists face extinction, according to the latest World Conservation Union (IUCN) Red List of Threatened Species.

Overall, the report notes that 16,119 animal and plant species are in danger of extinction, including one in eight birds, one in four mammals and one in three amphibian species. Since records began, 784 species have been declared extinct. From the poles to the deserts, 'biodiversity loss is increasing, not slowing down,' says IUCN director-general Achim Steiner.

The main cause is people, as humanity impacts on the world's fauna and flora both directly and indirectly. While hunting and habitat loss continue to have a disastrous effect on species numbers, global warming is emerging as another important threat. Thus:

■ Large numbers of polar bears will starve or drown as global warming melts the Arctic's ice sheets, reducing their population over the next 45 years from as many as 25,000 today to 17,500.

■ Hunting and habitat loss mean that fewer than 300 dama gazelles (Gazella dama) remain, their numbers having crashed by 80 per cent over the past decade. The scimitar-horned oryx (Oryx dammah) is now extinct in the wild, while numbers of the goitered gazelle (Gazella subgutturosa) are also in sharp decline.

The IUCN's new list includes 547 species of shark and ray, of which at least 20 per cent are in danger of extinction, including the common skate (Dipturus batis). The angel shark (Squatina squatina), once a common sight in the fish markets of Europe, is now extinct in the North Sea and has been declared critically endangered elsewhere.

Conservation can work, says Steiner. Efforts in Europe in the 1990s have led to a doubling in the numbers of white-tailed eagles (Haliaeetus albicilla). On Christmas Island in the Indian Ocean, the Abbott's booby (Papasula abbotti), a native seabird, was in decline because of both habitat loss and the introduction of the yellow crazy ant, *Anoplolepis gracilipes*. Its numbers are now recovering, and the booby's status has been revised from critically endangered to endangered.

Nevertheless, Steiner emphasises that environmentalists alone cannot save the world's biodiversity: 'It must become the responsibility of everyone with the power and resources to act.'

GOOD CORE PRACTICE

A groundbreaking piece of legislation called the Company Law Reform Bill is currently making its way through Westminster.
The bill, which is being driven by the Corporate Responsibility Coalition (CORE), made up of 130 charities including Christian Aid and WWF, will make it mandatory for directors to report environmental and social impacts alongside their financials. They will also have to take the care of local communities and the environment into consideration alongside profit maximisation, as well as giving people the right to seek compensation for any human rights or environmental abuses committed by UK companies or their overseas subsidiaries.
For more see **www.corporate-responsibility.org**

> In the United States of America, unfortunately we still live in a bubble of unreality. And the Category 5 denial of the reality of climate change is an enormous obstacle to any discussion of solutions. Nobody is interested in solutions if they don't think there's a problem.

former presidential candidate Al Gore, whose film, *An Inconvenient Truth*, is currently on general release.

CANCER CLUSTER CAUSES OFFICE PANIC

Health authorities in Melbourne insist there is no link between the mobile phone towers perched on top of a university building and the brain tumours diagnosed in seven employees who worked in the building's top floors.
Australia's biggest telephone company, Telstra, maintains that the mobile phone towers on the building comply with all relevant health and safety standards and that the cancers are mere coincidence, but the offices at the Royal Melbourne Institute of Technology have been evacuated until definitive answers can be found.

R.I.P. BLUE SMARTIES

Nestlé Rowntree is removing the artificial colours from children's popular chocolate treat Smarties. And because no natural alternative can be found, this means the end of the line for the blue Smartie.
Several artificial colours are being axed from Nestlé's range of sweets and candies. These include brilliant blue (E133), quinoline yellow (E104), sunset yellow (E110), ponceau 4R (E124), and carmoisine (E122) – the same colours found in a 2002 government-funded study by the UK's Asthma & Allergy Research Centre to provoke tantrums, hyperactivity and poor concentration in children.
Specific concerns about brilliant blue include its link to hyperactivity and skin rashes.
It is also listed as a potential carcinogen by the US Environment Protection Agency. Similar health concerns surround the other artificial colours that are being withdrawn. Indeed, a recent study at Liverpool University found that mixtures of food colourings and additives are more harmful to the nervous system than when taken singly.
Although Nestlé says it is responding to calls from consumers for more natural ingredients, the company continues to face heavy lobbying from campaigners worried about the effects of the chemicals on children's health.

$2

The daily wage for Vietnamese factory workers who make stuffed animals that will be sold in the US by Hallmark, Disney, and Starbucks.

MOTHERS AND DAUGHTERS LINKED BY POLLUTION

Recent lab tests in the US show that mother and daughter share an unwanted bond – a body burden of industrial chemicals that gets passed down across generations.

Tests commissioned by the Environmental Working Group (EWG) found that each of the test subjects' blood or urine was contaminated with an average of 35 consumer product ingredients, including flame-retardants, plasticisers and stain-proof coatings. These mixtures of compounds, found in furniture, cosmetics, fabrics, and other consumer goods, have never been tested for safety.

Previous EWG tests, as well as those by the US Center for Disease Control and other researchers, have found these and many other chemicals are building up in the bodies of all Americans. But these tests produced three eye-opening findings about the pollutants that can pass through a mother's placenta or breast milk into her daughter's body.

Much of the chemical burden inherited by daughters at birth will last for decades, some for a lifetime. The daughters are likely to pass on to their children some of the very chemical molecules they inherited from their mothers. The estimated age by which a daughter will purge 99 per cent of the inherited pollution ranges from one day for phthalate plasticisers, to one year for mercury, to between adolescence and 60 years for common flame retardants and stain-proofing chemicals, to 166 years for lead.

'EPA studies show that children from birth to age two are 10 times more sensitive to cancer-causing chemicals than adults,' said Jane Houlihan, EWG's vice president for research. 'Scientists have found that chemicals' toxic effects can be passed down for four generations, by causing permanent genetic changes that can be inherited.'

> Terminator technology locates food sovereignty, once the very backbone of community, in the hands of technologists and large corporations. All Christians pray "Give us this day our daily bread". That this profoundly material request appears in this profoundly spiritual prayer, signals for us the centrality of food in our lives, as well as the indivisibility of the material and spiritual in the eyes of God. It is of great concern to me that life itself is now often thought of and used as a commodity.
>
> Rev Dr Samuel Kobia, general secretary of the World Council of Churches, in a statement calling on churches and ecumenical partners around the globe to take action to stop the technology.

SHAREHOLDERS PUSH FOR SAFER PRODUCTS

It is not enough to judge companies' environmental practices simply by measuring their emissions, waste sites and penalties, say a radical group of US investors.

Instead the group of 17 investing organisations, collectively representing more than $22 billion in assets under management, propose that companies be benchmarked for their progress in adopting safer chemicals policies and practices to reduce customer exposures to toxic chemicals in products.

'Unfortunately,' stated Lauren Compere, director of shareholder advocacy at Boston Common Asset Management LLC, 'the corporate community has been largely failing to respond to emerging science showing health and environmental risks of an array of chemicals in products. Companies are not moving to safer alternatives quickly enough.'

Among those companies being asked to address the role of toxics in their products are CVS Corp, ServiceMaster/ChemLawn, Whole Foods Market, Dow Chemical and DuPont.

ONE-WOMAN PROTEST HELPS HALT HUGE INDIAN DAM PROJECT

A starving woman has brought the biggest infrastructure project in a booming India to its knees.

Ms Patkar began her 20-day hunger strike when work started on the Sardar Sarovar, the biggest of 30 proposed dams along the Narmada river. She claimed that hundreds of thousands of people will lose their homes in Madhya Pradesh state and that their plight was being ignored because they are poor. Under pressure, the federal government sent a team to investigate the rehabilitation efforts.

PHOTOGRAPHS BY **HARIKRISHNA/DEEPA JANI**

The team found that at the largest site families were being relocated to, 'no sanitation, no drinking water, no system of sewage, no roads, much less the facilities like hospital, water reservoir, school, post office have been provided there.' Displaced families were being encouraged to accept cash handouts instead of proper rehabilitation – and the government was charging them income tax on the handouts.

After forcing the issue of the dam onto the front pages of all India's national newspapers day after day, the Supreme Court has ruled that work on the dam cannot be completed unless thousands of people whose homes will be flooded are relocated and rehabilitated. If this rehabilitation is not carried out swiftly, the court will exercise its power to order a complete halt to the work.

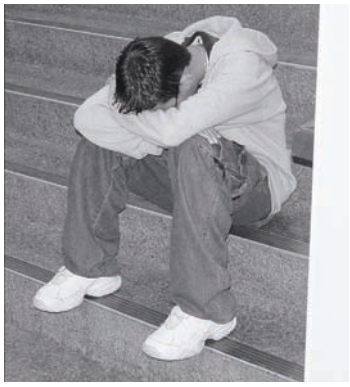
3,738

Filipino mothers set a new world record for simultaneously breastfeeding their babies in a Manila stadium in order to raise awareness not only of the benefits of breastfeeding, but also of the 16,000 Filipino children who die annually due to formula feeding.

DIRTY BANANAS

More than 70 human rights, students, women's, consumers and labour rights organisations and trade unions from Europe and the U.S. have charged the Dole Food company with a massive failure to respect human rights.

Dole Food Inc., with US $5 billion in annual revenues, is the world's largest producer and marketer of fresh fruit and vegetables. For more info **www.bananalink.org.uk**



ANTIDEPRESSANT UPS SUICIDE RISK IN ADULTS

Britain's best-selling antidepressant, Seroxat, can cause adults as well as children to become suicidal. For years manufacturer GlaxoSmithKline denied there was a problem with the drug. But a recent reanalysis of data, requested by the US Food and Drug Administration, which is reviewing the safety of the group of antidepressants known as selective serotonin reuptake inhibitors (SSRIs), has forced the company to admit there is a risk in adults. Seroxat was already banned for use in children for the same reason.

Seroxat is given to patients not only for depression and anxiety, but for a range of other problems defined by psychiatrists as separate conditions, such as panic disorder, generalised anxiety disorder and obsessive-compulsive disorder. Its multiple uses have helped it become the biggest-selling SSRI in Britain; in 2003 doctors wrote 19 million prescriptions for the drug for patients with anxiety and depression.

Reports suggest that GSK has known about this increased risk for 15 years, but has failed to pass this information on to doctors

GLOBAL WARMING IS 'SURVIVABALL'

Anti-corporate activist-pranksters 'the Yes Men' have struck again, this time posing as representatives of multinational Halliburton. The pair crashed the Catastrophic Loss conference held at the Ritz-Carlton hotel, Amelia Island, Florida and enthralled audiences with news of an advanced new technology – the Survivaball – that will keep corporate managers safe even when climate change makes life as we know it impossible. The pair revealed that scientists agree that in order to prevent climate change catastrophe, we must reduce our carbon emissions by 70 per cent within the next few years. But since doing so would seriously undermine corporate profits, a more forward-thinking solution is needed. 'This technology,' they confided to an attentive and appreciative audience, 'is the only rational response to abrupt climate change.'

TREES FOR TISSUES

Greenpeace activists recently blockaded a Kimberly-Clark factory in Huntsville, Ontario, demanding that the company stop making Kleenex and other disposable tissue products from clear-cut ancient forests, including Canada's Boreal.

The environmental group is demanding that Kimberly-Clark dramatically increases the use of recycled fibre in its entire line of products, and only purchases virgin fibre from logging operations that are sustainable and certified by the Forest Stewardship Council.

'Forests are disappearing across this country and around the world, and they need protection urgently,' said Christy Ferguson, Greenpeace forests campaigner in Ontario. 'We will not let companies like Kimberly-Clark go unchallenged as they rip down one of the largest intact ecosystems left on earth to make products that are used once and then thrown away."

Stretching from Newfoundland to the Yukon, Canada's Boreal forest represents over 25 per cent of the world's remaining intact ancient forests. It is home to numerous aboriginal communities, as well as hundreds of species of birds and animals, including the endangered woodland caribou and wolverine. A carbon storehouse, the Boreal is essential in fighting global climate change.

PHOTOGRAPHS BY **GREENPEACE**

THE DRUGS (STUDIES) DON'T WORK

'Whichever company sponsors the trial produces the better antipsychotic drug.' That's what researchers writing in *The American Journal of Psychiatry* have recently concluded.

Psychiatrist John Davis and colleagues analysed every publicly available trial funded by the pharmaceutical industry, pitting five new antipsychotic drugs against one another. Their findings? Nine out of 10 trials claimed that the best drug was the one made by the company funding the study. Often, the finding is not outright fabrication. Some industry-funded studies, for instance, use too low a dose of a competitor's drug, while others choose statistical techniques that show their drug in the best light. Davis and colleagues estimate '90 per cent of industry-sponsored studies that boast a prominent academic as the lead author are conducted by a company that later enlists a university researcher as the "author"', and noted that such studies amounted to little more than 'advertisements' for the drug.

Proliferate This

BY DAVID WEST

In terms of nuclear proliferation, it's one rule for them and another for us. While Bush and Blair condemn Iran for its programme, they appear to be pushing ahead with their own nuclear weapon agenda.

In January, Iran announced the reactivation of its uranium enrichment programme, drawing vocal condemnation from the West. In his 2003 State of the Union address, George W Bush said: "In Iran, we continue to see a government that represses its people, pursues weapons of mass destruction, and supports terror." However, Iran's spiritual leader, Ayatollah Khamenei, issued a fatwa against nuclear weapons, while President Mahmoud Ahmadinejad stated that his government wishes to use nuclear technology for civilian, not military, purposes – which they are allowed to do under the Nuclear Non-Proliferation Treaty (NPT).

Convinced that Iran intends to develop weapons, the US and UK governments are pressing the United Nations Security Council to impose sanctions. Meanwhile, in May Brazil announced that it is enriching uranium and faces neither condemnation nor a reprimand from the Security Council.

From the accident at the Mayak nuclear plant in 1957, to the Windscale fire, Three Mile Island, Chernobyl and Tokaimura, the history of civilian nuclear power is a warning that goes unheard by governments across the globe. Bush and Blair rattle their sabres against Iran and bellow about non-proliferation, but all of this demonstrates that a selective approach to non-proliferation is unworkable. When it comes to nuclear technology and the safety of our planet, it's all or nothing.

Bust my bunker

After the fall of the Soviet Union, the US government tentatively began reducing its nuclear capabilities. In 1995, under Clinton, US nuclear weapons spending reached its lowest level at $3.4 billion. Under George W Bush spending rose to $6.5 billion for the 2004 fiscal year and is predicted to reach $7.76 billion by 2009. The administration is pursuing a new class of weapons in contravention of the NPT and blocking international disarmament efforts even as it condemns Iran.

The Spratt-Furse Prohibition was an amendment of the 1994 Defence Authorisation Act, authored by Representative John Spratt and Representative Elizabeth Furse, that forbade any funding for the research and development of low-yield nuclear weapons. 'Low-yield' specifically applies to weapons of less than five kilotons, although it was a 15 kiloton bomb that destroyed Hiroshima, so 'low-yield' is misleading.

This was the point raised by Spratt and Furse; that the low-yield concept would blur the demarcation between conventional and nuclear conflict and increase the likelihood of such devices being deployed. The Bush administration has repeatedly sought to overturn the Spratt-Furse Prohibition. In an address to Congress in September 2003, Representative Feinstein, a supporter of the Prohibition, stated: "There should be no doubt in anyone's mind that this administration is reopening the nuclear door. They are doing this to develop essentially a new generation of nuclear weapons."

The reason for the attempt to overturn the amendment is the Bush administration's desire to acquire what are colloquially known as bunker busters, or Robust Nuclear Earth Penetrators (RNEP). The purpose of these weapons is to destroy deep underground targets, such as bunkers buried at sufficient depth to render any conventional weapons ineffective. In February 2003 Congresswoman Heather Wilson and Congressman Chris Cox issued the report *Differentiation and Defence: An Agenda For The Nuclear Weapons Program*, in which Wilson wrote: "We are living in a different world with new and emerging threats. The nuclear threat is numerically smaller, but more diverse and less inherently stable. Our nuclear weapons program must adapt."

Her colleague Cox added: "To maintain a strategy of deterrence in this new environment, the United States will have to hold hard and buried targets at risk." Developing new weapons of this nature is in clear violation of the Non-Proliferation Treaty.

The Fiscal Year 2006 Defence Authorisation Bill included a request for RNEP funding. Senator Ted Kennedy led the opposition: "What moral authority do we have to ask other nations to give up their desire for nuclear weapons of their own when we are developing a new generation of such weapons?"

Doubts have been cast on the feasibility of the RNEP by the Natural Resource Defence

> "There should be no doubt in anyone's mind that this US administration is reopening the nuclear door. They are doing this to develop a new generation of nuclear weapons"

ILLUSTRATION BY **ADRIAN TEAL**

Council and in a report by Robert W Nelson for *The Journal of the Federation of American Scientists*. Nelson referenced the US military's own research, the Plowshare Tests, which demonstrated that for a five kiloton detonation to be fully contained, it had to occur at a depth of 650 feet underground. To date, trials of the earth-penetrating B61-11 missiles dropped from a bomber at 40,000 feet have only penetrated 20 feet into dry soil. At this depth the explosion would produce a huge cloud of radioactive dirt and Nelson concluded that, far from limiting collateral damage, the use of such a device in an urban environment "would result in massive civilian casualties".

The Bush administration, not renowned for favouring science over rhetoric, continues to assert the necessity of the RNEP scheme, claiming that it would allow the military to take out buried targets with no impact above ground. The Natural Resources Defence Council claims the true goal is not the creation of a low-yield device, but a high-yield strategic weapon capable of hitting underground facilities, regardless of the wider devastation. The only nuclear states to possess such facilities that could oppose the US are China and Russia. If the United States continues developing the Robust Nuclear Earth Penetrator, it is not only in defiance of the NPT, but likely to encourage other countries to try to keep pace.

The United States has still not ratified the Comprehensive Test Ban Treaty and while it has not conducted a nuclear test since 1992, the door has been left conspicuously open for a return to weapons testing. The worst case scenario is that with China and Russia reactivating their nuclear weapons development programmes, there would be nothing to hold back Iran and North Korea or any other state considering membership in the atomic club.

The Senate remains unconvinced of the virtues of the RNEP and funding for the project was dropped from the Department of Energy's budget for the fiscal year 2006, despite the Bush

> "What moral authority do we have to ask other nations to give up their desire for nuclear weapons when we are developing a new generation of such weapons?"

administration requesting $4 million for RNEP research. The budget also contained $25 million for shortening the preparation time to resume nuclear tests to 18 months from the current two to three years. So despite the setback to the RNEP program, the President's nuclear ambitions continue to grow, even as he flouts the NPT.

Rent-a-Rocket

"We are committed to working towards a safer world in which there is no requirement for nuclear weapons," said British Defence Secretary John Reid in December 2005, "and continue to play a full role in international efforts to strengthen arms control and prevent the proliferation of chemical, biological and nuclear weapons."

The UK scaled down its arsenal after the Cold War from over 350 warheads to fewer than 200. These are in the form of Trident II D-5 missiles, carried aboard four Vanguard-class submarines. The warheads are built and serviced by the Atomic Weapons Establishment (AWE), but the missiles are supplied by the United States' Lockheed Corporation and loaded onto the submarines at an American naval facility.

Dennis Healey described this arrangement as "rent-a-rocket", for without the US missiles the Trident system is inoperable, hardly the much vaunted "independent deterrent".

The present batch of warheads have a working life of at least another two decades, but the length of time required to create replacements means that work on the next generation will have to begin soon to maintain an unbroken nuclear capability. Tony Blair has publicly stated that no final decision has been made on Trident; however the average annual budget for the AWE is set to rise from £300 million to £507 million, with a further £1.5 billion over the next two years. Blair has claimed that these splurges are for maintaining the existing capability, but the increases suggest that the AWE is preparing to start on the next class of warheads.

Such an undertaking violates the UK's NPT obligations to move towards disarmament, but the Defence White Paper of December 2003 addressed the proliferation question in language akin to that of President Bush's administration - proliferation is something other people do: "Continuing proliferation of WMD provides another pressing cause for concern. Some states will continue to seek WMD, particularly as access to the technology and production becomes easier. The means of delivering such weapons are also being proliferated, as we have seen with missile technology transfers from North Korea to a number of states. The international community's response to such proliferation, particularly of nuclear weapons, must be firm. We do not believe the world community should accept the acquisition of nuclear weapons by further states."

The Ministry of Defences' Strategic Defence Review notes "the continuing role of nuclear weapons as the ultimate guarantor of the UK's national security." However, the very same White Paper contains the admission that: "There are currently no major conventional military threats to the UK or NATO…" So who is Trident protecting the British from?

This was a question in the mind of the late Robin Cook, writing in *The Guardian* on 29 July 2005. "It is not easy to see what practical return Britain ever got out of the extravagant sums we invested in our nuclear systems. None of our wars was ever won by them and none of the enemies we fought was deterred by them." Cook described Trident as "hopelessly irrelevant" in confronting terrorism and three Labour MPs have come forward to challenge Tony Blair on Trident – Gordon Prentice, John Austin and Paul Flynn.

Blair is keen to avoid a Commons vote, despite the fact that the cost of replacing the Trident system will be at least £12.52 billion based on figures in the 2001 Strategic Defence Review. Paul Flynn is dismissive of the British nuclear arsenal's relevance to the current activities of the British Armed Services. "They have nothing at all to do with our peacekeeping role and our role in disaster emergencies, which are probably the main activities where our military is going to be involved, particularly in peacekeeping, the most useful thing we do in the world."

"We're only acting as agents of the United States," continues Flynn. "We couldn't conceivably ever use them without the United States say so. It's just a meaningless symbol. Trident is going around the world at the moment and the missiles aren't targeted on any cities or persons or anything at all. We're just going through the motions at huge cost. I can't see any possible situation in the future where they are likely to be of any value."

Not only is Trident of no practical use, the upgrading or replacing of the system directly contravenes the British government's NPT obligations to move towards disarmament.

"It is not easy to see what practical return Britain ever got out of the extravagant sums we invested in our nuclear systems. None of our wars was ever won by them and none of the enemies we fought was deterred by them."

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TURNING THE WORLD UPSIDE DOWN - A CAMPAIGN FOR DEMOCRACY

THE PROBLEM

People are disengaged from our official political system. Let's take a scenario faced by communities all over the country to illustrate this. For various reasons local shops (or it could be Post Offices, schools, hospitals, or other public services) close; so people have to drive further to shop or work - increasing traffic congestion and CO2 pollution. At least those who have cars can: those without are stuck, stranded and even more excluded from society.

So communities and neighbourhoods decline. Streets become boarded up, empty and dirty. Crime increases. Then having seen their communities become a shadow of what they were, and politicians (and democracy!) powerless to stop it, people are exhorted to "be involved in democracy and civic life". We should not be too surprised if that is seen as a joke.

The people of Britain are not apathetic, they want to be involved, to decide how their communities are developed and conserved. But currently they do not have the power to do so. The decline in local political power has been mirrored by a decline both in trust in politicians and the belief that our political system is capable of directly changing people's lives. As people have stopped believing in democracy they have stopped participating in democracy.

The recent Power Enquiry, chaired by Baroness Helena Kennedy, into democratic disengagement highlighted the crucial need to empower citizens if we are to attract them back to democratic participation. Our political systems do not do this, they do not deal with a problem that all citizens face every day when they open their front door; the state of their communities or neighbourhoods. If "democracy "remains distant from this it will not involve people and it won't deserve to either. We need a solution, urgently.

A SOLUTION - THE SUSTAINABLE COMMUNITIES BILL

The Sustainable Communities Bill, which has been drafted by a large coalition of community organisations and environment groups, will turn the world upside down. It will return to people power over their own communities and neighbourhoods.

The Bill sets up a mechanism to fight the problems of over-centralisation and community decline based on the philosophy that communities are the experts on their own problems and the solutions to them. Therefore those communities and their local councils should decide what policies are needed to reverse the problem. Note that word: "decide". This is not another "consultation" in which the government decides in the end: so the Bill sets up a process that enables communities and councils to tell the government what to do.

In other words, this Bill turns the world upside down. For the first time it establishes that government policy and actions will be driven from "below". It makes democracy relevant to the problems faced by citizens who, as the Power Inquiry said, feel "contempt towards formal politics". As such, it is probably one of the most exciting, radical and powerful "democracy" Bills that has been before parliament in recent times. Your support crucial

It will take a massive grass roots campaign to persuade MPs and the government to make this Bill law so your support is crucial. So far 294 MPs have signed a parliamentary motion (EDM 641) in support and 11,000 individuals support the campaign.

We urge you to please sign up!
online: www.localworks.org
post: 94 White Lion St, London N1 9PF
phone: 020 7833 9898.

LOCAL WORKS
Campaign for the Sustainable Communities Bill

Well, not according to former Secretary of State for Defence Geoff Hoon, who told the House of Commons in October 2003 that: "Under the terms of the nuclear non-proliferation treaty, the United Kingdom, the United States, France, China and Russia are legally entitled to possess nuclear weapons." This is wholly incorrect as Article VI of the Treaty makes clear.

Hoon's highly personal interpretation of the NPT is emblematic of the selective approach of the US and the UK that the NPT only applies to everyone else. It is hardly any wonder that Iran and North Korea feel no obligation to respect the Treaty, when the very governments pressurising them to abandon their nuclear programmes refuse to play by the same rules. Blair, backed by the government's chief scientific advisor Sir David King, is calling for ten new nuclear power stations to meet Britain's growing energy needs. Little wonder that Iranian President Ahmadinejad accuses the West of double standards.

The United States military budget for 2004 contained just $38 million allocated for the dismantlement and disposal of nuclear weapons. That's less than one per cent of the total $6.5 billion budget. The NPT has been in force for thirty-five years, yet the world is no closer to freedom from nuclear annihilation now than it was in 1970. The NPT is headed for meltdown, as Bush and Blair continue to invest in weapons of mass destruction while precipitating international conflict. Our nuclear future awaits.

■ David West is a freelance journalist

Let's get this party started!

BY HELENA KENNEDY

Helena Kennedy, chair of the Power Inquiry, explains why we need a wholesale reform of our voting system in order to rebuild parties and end funding scandals

Despite the media storm around the cash for honours scandal of the last few weeks, one question has rarely been asked: why is it that our elected leaders are now so willing to debase themselves before multi-millionaires in order to raise money? It is tempting to believe that Blair, Cameron and Co simply have a compulsive attraction to the rich, but the truth is actually more worrying.

For a large part of the last century, our main political parties were mass organisations with hundreds of thousands of members and many more firm supporters willing to buttress party finances through small donations and subscriptions. Of course, business and the unions donated very significant funds to the Tories and Labour respectively, but the mass membership was an important source of cash.

In the last 40 years, however, both the membership of, and allegiance to, the main parties has severely declined. The three main parties now have less than one quarter of the members they had in 1964. Those who state that they have a 'very strong' allegiance to the main parties fell from 44 per cent in 1964 to 15 per cent in 1997.

At the same time, political campaigning has become increasingly expensive, given that parties no longer have a large volunteer force to rely on to take their message to the voters. Today's parties have to pay for pricy advertising campaigns and jet-setting strategists in order to garner votes.

So the desperate rush to fleece the wealthy is a direct result of our collapsed party system. Although a better system of offering state funds to parties may be part of the answer to the recent crisis, the much more pressing issue is how we can start to rebuild our political parties so that millions once again regard them as worthy of allegiance and voluntary funding.

Focusing on the wrong issue

Unfortunately, much of the thinking about this issue starts from the wrong place. Many politicians and party officials see this problem as one of internal structures and organisation. There is a growing consensus that the key to revived support is more flexible, open organisations that demand less commitment from people and escape the elitism and clubbiness of local parties. The Labour Party now places great emphasis on the future importance of its online registration of 'supporters' rather than members. And David Cameron has recently revealed that he wants his party to make much wider use of primaries, where parliamentary candidates are chosen by a vote of registered supporters rather than the traditional selection process open only to members and their committees.

While anything that refreshes the airless world of party organisation is to be welcomed, to believe that this will revive support is wrong. Millions have turned away from the main parties over recent decades, not because of the way they are organised but because they no longer reflect the values, identities and aspirations of the British people.

Change of cultural identity

The division between Conservative and Labour developed at the height of industrial Britain, when society was riven by the conflicts between a managerial and professional middle class and a skilled and semi-skilled working class. The cultural identities, ideological allegiances and economic interests of these two classes defined the respective cultures and programmes of the two parties. Equally, the parties drew their active support from the dense networks of organisations that glued these classes together – groups like the Women's Institute and the Rotary Club for the middle classes and the co-operative societies and working men's clubs for the working classes.

That era has passed forever. Traditional class identities, cultures and networks have severely declined, or disappeared altogether, as the economy that created them has been transformed by the great loss of manufacturing industry and its replacement by the service sector. The question is not why the main parties have lost members and support – this seems inevitable given the vast changes in our society since the 1960s – but why organisations that were designed for our industrial past still maintain such a tight grip on our political system in this post-industrial era?

The blunt truth is that they are held in place by an electoral system that dissuades voters from backing smaller and newer parties.

"Millions have turned away from the main parties because they no longer reflect the values, identities and aspirations of the British people."

Inevitably, political parties take a long time to grow and build support, but the British way of voting stunts that growth. Because we operate a winner takes all system in each constituency, it seems pointless voting for newcomers because they stand little or no chance of winning representation. There is an in-built inertia to our political system that keeps the existing parties comfortably in position, even though the underlying conditions that once placed them there are long gone.

In fact, people are now showing their disdain for this bankrupt political monopoly. Increasingly, voters simply don't turn out to vote and we know from the Power Inquiry's research that the main cause of this is the distaste for the main parties on offer.

By contrast, when a viable alternative is presented in the form of smaller parties or independent candidates that can seriously challenge main party domination – usually because of local factors – voters are showing a keenness to support them.

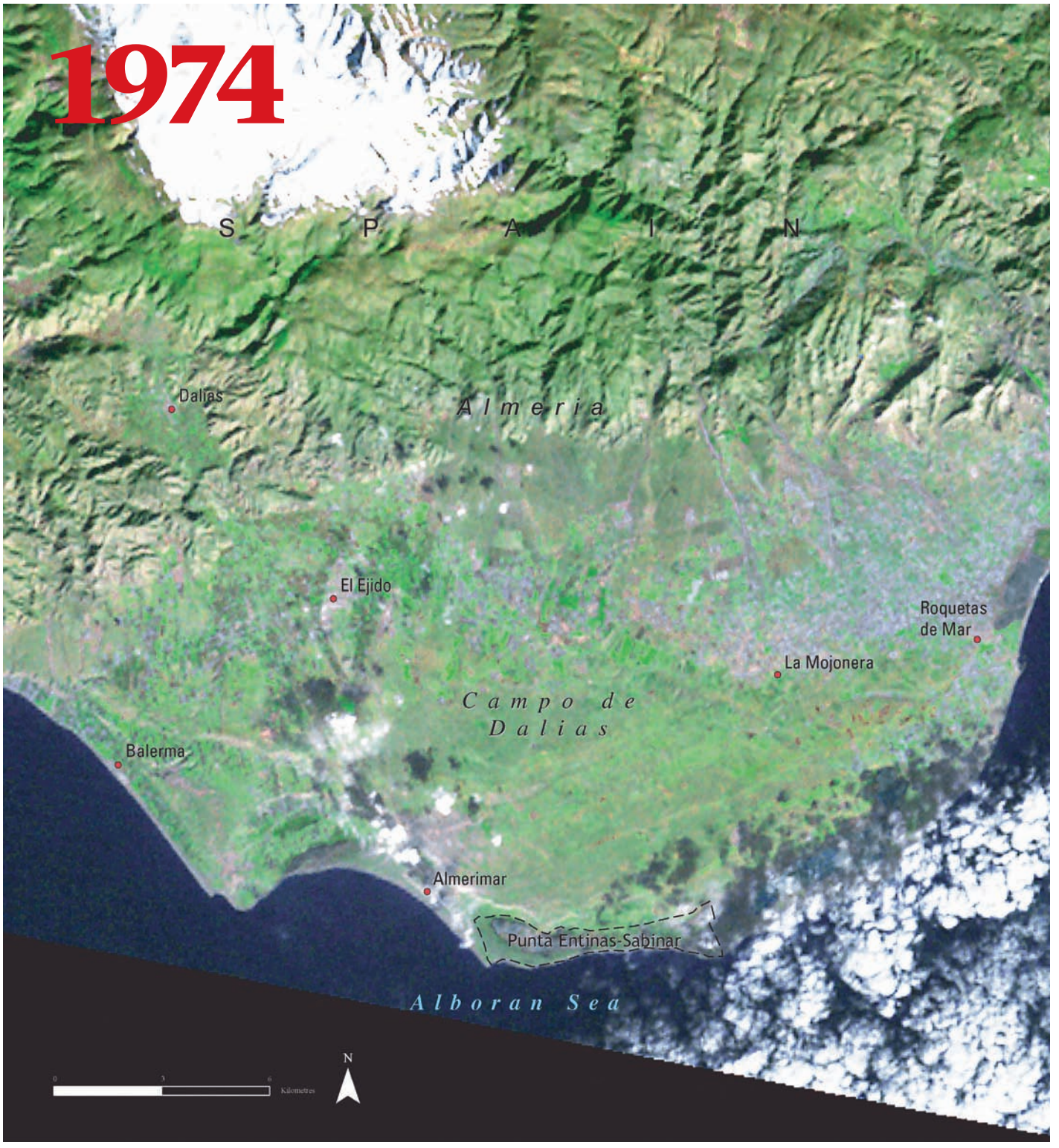
Reform the voting system

So, a central feature of any solution to the slow death of our main parties must be the reform of the electoral system rather than tinkering with party organisation. We need a system that is open enough that it allows new voices and candidates with deep links to their communities to penetrate our political system. The Power Inquiry suggested that a system such as Single Transferable Vote might best do this, but it had no firm view. However, it was clear that the system must give the voter as much choice as possible with the freedom to choose between candidates from the same party, as well as between parties themselves. This would mean no 'closed lists' where party leaderships select a slate of candidates and voters can only choose between those slates.

The slow process can then begin of forging the political alliances, and developing the programmes that better reflect the values and identities of today's citizens rather than those of 60 years ago. Then, and only then, will we have parties that rebuild support because they actually mean something to the British people.

■ The final report of the Power Inquiry can be downloaded from **www.powerinquiry.org**

> "Voters simply don't turn out to vote and we know from the Power Inquiry's research that the main cause is the distaste for the main parties on offer."



GOING, GOING...

...GONE? The second in a series of shocking satellite images of our dying world

PHOTOGRAPHS BY **STILL PICTURES**

AGRICULTURE, SPAIN. ALMERIA, 1974 AND 2000. The images illustrate how an area of approximately 20,000 hectares in southern Spain has been converted from typical rural farmland into intensive greenhouse agriculture for the mass production of all year round tasteless supermarket fruit & veg (areas dominated by greenhouses appear as whitish-grey patches). To solve the problem of limited water resources for irrigation, the Spanish government announced the Spanish National Hydrological Plan in 2001, which proposed the construction of 118 dams and 22 water transfer projects. Thankfully the plan met with huge opposition in Spain and in 2004 the government abandoned it's environmentally suicidal plans. Meanwhile, the water shortages grow ever more acute.

LIFE ON THE EDGE OF A WARMING WORLD

The native Inuit people of the Arctic regions need no convincing of the effects of global warming. As **Clare Kendall** discovers, they are already suffering its impact.

In recent years, while governments around the globe have been prevaricating over carbon emission policies and scientists arguing over the existence of global warming, the arctic has been melting. To the native Inuits of Northern Canada, the United States, Russia and Greenland, global warming is a reality, not a series of hypothetical scenarios. Since the millennium they have seen their landscape, their livelihood and their very cultural identity eroded at such an alarming rate that they now look set to become the first society to fall victim to climate change in the 21st century.

In the remote arctic village of Puvirnituq in Nunavik, Northern Quebec, just south of Baffin Island, they know a good deal more than you and I do about global warming. After thousands of years on the ice, they are closely allied to their environment and notice even small changes.

This April they experienced temperatures normal for June and a visiting party of Canadian officials meeting to discuss climate change were forced to decamp to a tent when their igloo collapsed due to the heat. The Inuit elders of

Puvirnituq involved in its construction were anything but surprised as spring has been arriving here earlier and earlier for the last six years.

Eva Inukpuk, 41, an Inuit mother from Inukjuak, just south of Puvirnituq, said: 'My mother is 70, she grew up when they still lived in igloos. She used to be able to just look out of the window and tell me what the weather would be like the next day. Now, it could be anything. All her knowledge counts for nothing these days.'

Quara Irnikayak, who works at the Ivujivik municipal office in a village to the north, complained about the lack of snow. 'I look out at the mountains and I can see the rock. It should be completely white with snow. We haven't had enough snow this winter and there is open water in the bay!'

Mario Aubin, of the Nunavik Arctic Survival Centre in Puvirnituq, has spent most of his life with Inuits and knows first hand the cost of the shorter winters. 'Pack ice to the white man seems like a barrier, something to fear. But to the Inuit it's their highway. It's their communication system, their freedom, their livelihood, their independence. Without it there is no Inuit culture.'

When the survival school started six years ago, Mario could guarantee his clients five months of winter cold enough to build and sleep in igloos, from December through to the end of April. Now it is only six weeks long, mid January to the end of February. 'There will be some time before and after when it is cold enough, but we never know now when that will be. 'I had to cancel a course inside the arctic circle this March because there wasn't enough ice. I have a film crew here in the summer making a feature film. I think they may have to bring polystyrene blocks.'

Upheaval is not unknown to the Inuits. In the 1960s they were forcibly moved out of their igloo camps and into government subsidised pre-fabricated 'villages' along the coast. Previously a nomadic people, the social transition was not an easy one and the collision with modern western values was disastrous. All communities have serious alcohol and drug problems. Teenage suicide rates are among the highest in the world.

Despite these problems however, their very remoteness has insured their survival. To this day they are a people with one foot still firmly placed in their traditional way of life. If the weather is good, the school in Puvirnituq will empty as children go hunting with their parents. In Inukjuak when the caribou arrive or in Ivujivik when the beluga whales appear in the bay they hunt them – lessons or no lessons – and all the social problems seem to disappear when they are engaged in these traditional activities.

But the landscape to which they are so closely related is changing so rapidly it is difficult to see how they can adapt.

In the last three decades, 400,000 square miles of sea ice has melted. That's an area the size of George Bush's home state of Texas. The ice is also now 40 per cent thinner. Arctic air temperatures are warmer than they've been for four centuries and the more the ice melts, the less ice there is to reflect heat back into space and the process is accelerated.

Recently published findings by Eric Rignot and Pannir Kanagaratnam show that last year alone the melting Greenland ice sheet deposited 224 cubic kilometres of ice into the ocean as opposed to 90 cubic kilometres in 1996. Greenland contains enough land ice to raise ocean levels 23 feet. Antarctica holds enough to raise them by more than 215 feet. Sea levels also rose four to eight inches last year and already villages in the Pacific Islands have had to be relocated.

But what the people of Nunavik describe isn't just climate change. Change can be adapted to, accommodated. What they describe is climatic disruption. 'It isn't just that it is warmer,' said Aubin. 'It's the unpredictable nature of the weather now. We can go out hunting or fishing inland in March and find it's too warm to build an igloo, so we put up a tent and then the temperature suddenly drops again and we could freeze to death.'

In a petition to the Inter-American Commission on Human Rights recently many Inuits described accidents related to the rapidly changing climate. On the east coast near the Nunavik capital of Kujjuak, Lizzie Gordon describes losing several close family members who were killed in a freak blizzard. Her husband Sandy recalls an incident when travellers had to be rescued by helicopter because of sudden freak snowmelt. Even the experienced hunters have started falling through thinning ice, sometimes fatally.

They also talk of freak environmental incidents. Puvirnituq experienced an earthquake last month, much to the alarm of the local people. Scientists believe it was caused by glacial movement. The region's first ever thunderstorm was witnessed last November. Last May the town of Kuujjuarapik in the south of Nunavik experienced temperatures of 100°F, which brought TV crews scurrying in from the south.

Animals and birds, previously never seen in the area, are being spotted. In the same petition, Inuits describe seeing strange flowers or plants. Caribou have been seen to starve to death because of the lack of vegetation.

The shortage of food to hunt is also bringing polar bears dangerously close to human habitation. 'In the past we may have seen one polar bear near the village every year,' said Adamie Kalingo, the mayor of Ivujivik, the village situated on the most northerly tip of Quebec. 'Now there are many and they are hungry.'

They also talk of disturbing changes to the sun itself. 'It moves,' said Adamie Kalingo, 'in the sky. It's not right.'

Quara Irnikayak described a remarkably similar phenomenon. 'It's in a different place in the sky.' she said. 'It used to be lower. And it feels different to how it used to.'

'It is very sad,' said Inuit mother Eva Inukpuk from Inukjuak. 'My daughter Qulliq will not grow up eating caribou every day like I did. She will eat junk food and Pepsi. But we can't move. We can't live in the city. We hunt. That's what we do. That's who we are.'

Inuit skin is naturally very resilient to the sun, but in the last few years many have started to complain of burns and blisters in the summer. Piatsi Lamoureux from Ivujivik complains that her skin gets burnt even in the winter and she has to wear sun block. 'My husband is in Quebec city right now,' she said. 'He will bring some sun screen back for me because I have run out. I have to wear it even in the winter now. This has only happened in the last five years.'

Winds have also become noticeably stronger in the last few years, which causes distruption and helps break up the sea ice. 'It makes the snow a different colour,' said Adamie. 'Not a good clean white, but a kind of grey. It is very disturbing to see.'

In the Nunavut capital of Iqaluit, on Baffin Island to the north, one woman has brought the Inuit concern to the table of global politics. Sheila Watt-Cloutier, an Inuit grandmother and professor of statistics, has become a mouthpiece for her native communities and is currently trying to sue the US Government under its own human rights laws, in order to force it to cut back on carbon dioxide emissions.

In her role as the elected chair of the Inuit Circumpolar Conference (a federation of 150,000 Inuits from Canada, Greenland, Russia and the United States), she instigated the filing of a petition last year with the Inter-American Commission on Human Rights. Although the commission has no power of enforcement, a finding in favour of the Inuits could provide the basis for future lawsuits in federal courts throughout the United States and has already forced governments across the world to accept the reality of global warming.

Watt-Cloutier claims that more has to be done, notably by the United States. 'The US is by far the biggest culprit,' she said in a recent interview, 'producing 26 per cent of greenhouse gases emitted into the atmosphere.' She says that the will for action is there from most of the Arctic council (Canada, Finland, Iceland, Japan, Norway, Russia, Sweden and the United States), but because it acts only on consensus from all members progress is slow without their cooperation. 'It is difficult for seven countries to move forward if the eighth is not on board,' she said.

The petition, if successful, could transform global warming politics. Arguing that the actions of one nation can violate the rights of a people beyond its borders. Despite some fierce opposition from commercial factors within the United States, Watt-Cloutier has succeeded in putting arctic meltdown firmly on the global agenda, and has been given a number of prestigious international awards for her work.

'The actual act of going out onto the land, and the skills that are required to survive these conditions are the very skills young people need to survive the modern world,' she said.

'What the land teaches you ... is to be bold under pressure, to withstand stress, to be courageous, to be patient, to have sound judgment and ultimately wisdom.' Without that land it is hard to see a future for the Inuit culture: they will be trapped in a cultural no-man's land, separated from their historical roots but unable to integrate into modern Canadian society.

'It is very sad,' said Inuit mother Eva Inukpuk from Inukjuak. 'My daughter Qulliq will not grow up eating caribou every day like I did. She will eat junk food and Pepsi. But we can't move. We can't live in the city. We hunt. That's what we do. That's who we are.'

PHOTOGRAPH BY **CLARE KENDALL**


ski-doo

BEHIND THE LABEL

DIET COKE

Far from being the healthy drink implied by its sports sponsorships, Diet Coke is a worrying cocktail of neurotoxic and potentially carcinogenic chemicals. BY **PAT THOMAS**

INGREDIENTS

Carbonated water, colour (caramel, E150d), sweeteners (Aspartame, Acesulfame K) Flavourings including caffeine, phosphoric acid, citric acid, preservative (E211, Sodium Benzoate)

Diet Coke was first introduced in the US in July 1982 and today it is the fourth most commonly consumed carbonated beverage in the world.

Apart from being the beverage of choice for sugar-phobic individuals the world over, Coca-Cola is one of the longest standing 'corporate partners' (since 1974) of the Fédération Internationale de Football Association (FIFA). In 1998 the company signed an unprecedented eight-year agreement to sponsor FIFA events – not just the prestigious World Cup, but also the Women's World Cup, the Confederation Cup, various youth championships and the upcoming World Cup Trophy Trip, a roadshow that will take the FIFA World Cup Trophy on tour to cities throughout the world.

Last year Coca-Cola extended its FIFA sponsorship commitment until 2022, a move that prompted the preposterous statement by company Chairman and CEO, E. Neville Isdell, that Coke's recommitment to the world's most popular sport 'affords us a new opportunity to bring people closer together through football'.

It also helps them shift a lot of cans and bottles. A recent study by marketing information company ACNeilsen revealed that the Coca-Cola brand is the global leader among beverages, generating well over $15 billion in sales globally each year. Coke and Diet Coke each generate more than a billion dollars in sales yearly. Five countries – the US, the UK, Germany, Canada and Brazil – guzzle more of this supposedly healthy, sugar-free alternative to regular Coke than anywhere else in the world.

Aggressive marketing like the FIFA sponsorship and clever jingles like 'Always Coca-Cola' keep Coke in our consciousness, but before you 'grab a Coke and a smile' at this year's main event, consider just what you are putting into your body. Although Diet Coke has a strong association with sport and health, it is actually a worrying mixture of neurotoxic and potentially carcinogenic high intensity sweeteners (aspartame and acesulfame K), tooth and bone destroying acids (phosphoric acid) and DNA damaging colourings (sulphite ammonia caramel), as well as psychoaddictive caffeine and other undisclosed 'flavourings'.

It also contains sodium benzoate, which can be broken down into the listed carcinogen benzene in the presence of strong acids, such as the citric acid found in this product.

Soda manufacturers have been aware of this synergistic possibility since the 1990s, but without pressure from regulatory authorities to change their formula to prevent the formation of benzene, have continued to mix benzoates and acids.

Ironically, the high fructose syrups used in regular drinks seem to slow this reaction down, and the formation of benzene appears to be most problematic in diet drinks.

INGREDIENTS	PURPOSE	ADVERSE EFFECTS
Aspartame	Sweetener	Breaks down easily in heat and during storage to its neurotoxic components phenylalanine, aspartic acid and methyl alcohol. According to the FDA aspartame is associated with headaches, dizziness, loss of balance, mood swings, nausea, memory loss, muscle weakness, blurred vision, fatigue, weakness, skin rashes, joint and musculoskeletal pain. (For a full report on aspartame toxicity see the *Ecologist* September 2005). The most recent evidence shows that aspartame ingested at levels that are currently found in daily soft drink consumption raises the risk of otherwise rare brain tumours known as lymphomas.
Acesulfame K	Sweetener	Causes cancer in animals. Acetoacetamide, a breakdown product, has been shown to affect the thyroid gland in rats, rabbits, and dogs. Although it is commonly blended with aspartame to cover its bitter taste, there are no studies to show if the combination is safe or whether it produces other toxic by-products.
Phosphoric acid	Acidifier	Can contribute to erosion of tooth enamel; leaches calcium from bones. Children with high intake of phosphoric acid suffer from brittle bones and a higher risk of fractures that follow them throughout life. Children consuming at least six glasses (1.5 litres) of phosphoric acid-containing soft drinks daily have more than five times the risk of developing low blood levels of calcium, compared to children who don't drink sodas.
Citric acid	Preservative, acidifier	On its own relatively harmless, though it can be harsh on tooth enamel. When mixed with potassium or sodium benzoate (see below) during storage, and especially at raised temperatures, it can aid the formation of carcinogenic benzene.
Caffeine	Flavouring	A stimulant, psychoactive compound that can provoke mood changes, lethargy and headache. Caffeine is addictive and ingestion of high levels can cause miscarriage as well as contribute to peptic ulcers and heart ailments. At the levels added to soft drinks caffeine adds virtually no flavour but does, if consumed regularly, trigger caffeine addiction. Children consuming caffeine have higher incidences of illness, headaches, sleep problems and iron depletion. A 330ml bottle of cola contains about half the caffeine of a cup of coffee.
Sodium Benzoate (E211)	Preservatives	People who suffer from asthma, rhinitis or urticaria may find their symptoms get worse following the consumption of benzoates. In acidic solutions (such as sodas), benzoates can break down into benzene, a known carcinogen. Surveys have shown that levels in soft drinks can be up to 40 times higher than recognised 'safe' doses.
Sulphite ammonia caramel (E150d)	Colouring	Made by heating sugar, ammonia and sulphite-containing compounds, the sugar can sometimes come from GM maize. Ammonia is toxic by all routes of exposure, and caramels made by an ammonia process may damage genes, slow down growth, cause enlargement of the intestines and kidneys and may destroy vitamin B. This colouring has never been fully evaluated for its potential carcinogenicity or reproductive toxicity.

NOTE: Space restrictions prohibit full referencing, however, Behind the Label draws on data from published studies and reports in medical, scientific and trade journals, government-sponsored databases (e.g. the US National Library of Medicine) and relevant Material Safety Data Sheets (MSDS).

A DIET COKE BY ANY OTHER NAME...

You may need to check the ingredients label carefully when you buy a sugar-free Coke. Over the years, there have been several variations of the Diet Coke recipe utilising various flavourings, such as vanilla, lemon, lime and cherry, as well as a whole range of artificial sweeteners. Names and formulations change according to local labelling laws and consumer preferences. What we drink as Diet Coke in the UK, for example, is known as Coca-Cola Zero elsewhere. And in 46 of the 149 countries where Diet Coke is sold and where the word 'diet' has undesirable connotations, it is known as Coca-Cola Light.

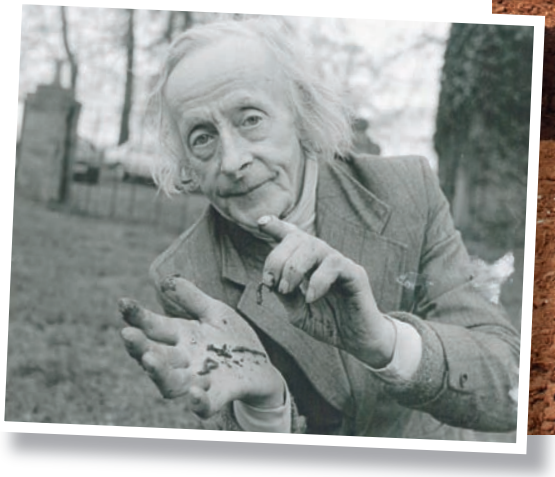
A TALE OF

...ONE FIGHTING TO STAY ALIVE, THE

FORDHALL FARM

After 65 years of organic production Fordhall Farm is under threat, but they are fighting back with a pioneering project that they hope will save the farm and forge new links with their local community. **Dan Grace** reports.

At 75 years of age Arthur Hollins cut a sprightly, energetic figure. The videotape is worn from repeated viewings, but watching him dash among the cows in the lush, green fields at Fordhall Farm still conveys the passion he had for farming 'with nature'. In the next frame we see Arthur digging his hands deep into the rich, chemical-free, fertile soil, enthusiastically explaining to his interviewer the benefits earthworms bring to its structure. Now it cuts to a shot of the family together: Arthur, his wife



TWO FARMS

OTHER FIGHTING TO KEEP KIDS OUT OF PRISON

Connie and son and daughter, Ben and Charlotte, playing in the sun-dappled garden surrounding the farmhouse. 'Hopefully I'll live to see my children take over and continue my work,' Arthur smiles. The tape ends.

Arthur Hollins took over the 140-acre farm as a tenant farmer, at the age of 14, after his father died. The year was 1929 and the previous decades had seen increasing use of artificial fertiliser. This began during WWI in the government drive to produce more food at home, but when the economic depression of the 1920s and 1930s hit fertiliser producers, the decline of available soil improvers revealed the detrimental effect the fertiliser was having on the soil. Noticing this, Arthur swore off using chemical fertilisers and began to convert the farm onto a foggage system, the system that had served his grandfather so well, a traditional method of feeding grazing animals. Foggage is grass that has been neither cut nor grazed and left to stand from summer into winter. The animals can stay out all winter eating the grass directly, without it having to go through the processes of being made into hay §or silage.

Up to the mid-1970s the farm's focus was on dairy – it was one of the first places to produce live yogurt in the UK – and on Arthur's continuing development of the foggage system, which he believed was the only truly sustainable way to farm livestock. After the death of his first wife, Arthur moved the farm over to organic meat production with a restaurant on site. However in the mid-1990s, under increasing pressure to sell the land for development and subsequent legal costs, the farm went into decline.

Sadly Arthur Hollins died in January 2005, but he'd already seen his dream become reality as his children took over the running of the farm. 'It's my home, Ben and I grew up here, and we really do want to carry on our father's work.' Charlotte Hollins smiles. While most people her age are leaving the countryside and farming in droves, Charlotte (23), along with her brother, farm manager Ben Hollins (21), and project manager Sophie Hopkins (24), are bucking the trend with a pioneering project to save the farm from development and bring the land into community ownership forever. 'We've got to raise £800,000 by the 1st of July, and so far we've got £205,000. Yes, there's a long way to go before the land is secure, but we'll do it.'

Getting mullered...

Visible from the front door of the farmhouse looms the threat that now faces Fordhall Farm. Cows and sheep graze a field in the shadow of a squat grey building, its side covered by the Muller Dairy logo. The company built its main UK factory in Market Drayton, Shropshire, in 1991 and has been expanding ever since, recently announcing its intention to double the size of its dairy, despite having only recently completed work on a £24m extension, and it's the Fordhall land that Muller wants.

In 2003 Charlotte and Ben made the decision to set up the Fordhall Project to try and save the farm from disappearing into the industrial sprawl of the dairy giant. 'There's a certain irony in the future of our farm being threatened by a dairy firm, after all the pioneering work done here,' Charlotte admits. Not that the produce is comparable. A number of Muller's products contain hydrogenated vegetable fat, and therefore harmful trans fats, something you wouldn't have found

in the organic produce of Fordhall. It was at the public inquiry in 2004, called by the Moreton Faye Parish Council to challenge Muller's further development, that Fordhall achieved a stay of execution. That March they managed to secure a year-and-a-half extension on their lease – two days away from eviction. Despite the land still being earmarked for development, Ben and Charlotte began the work to make the farm financially viable again.

'After the public inquiry in 2004 we built up a good relationship with the then managing director of Muller, Ken Wood. He visited the farm and we showed him what we were doing here. He said he sympathised with us on a personal level but that decisions were made higher up the chain, and the driving force behind those decisions was what would be financially beneficial for Muller,' says Charlotte with a shrug of the shoulders. It seems that subsequent heads of Muller Dairies UK don't have the time or the inclination to talk to their neighbours. 'They won't even return our calls now.'

Now the UK's third largest grocery producer, Muller has secured an endorsement from a government planning inspector to double the size of its factory. The strange thing is that at an earlier enquiry into development on a site adjacent to Fordhall, Muller argued that it could not develop on the farm's land as the organic farming methods used there had made the topsoil so rich and heavy that it was unviable to move it for building to take place. 'They're acknowledging, indirectly, the value of what we're doing here, but they still want our land,' Charlotte points out.

> 'We've got to raise £800,000 by the 1st of July, and so far we've got £205,000.'

With the initial tenancy due to expire in September 2005, the Hollins were granted a further year's extension on their lease. At the same time they were offered first refusal on buying 128 of the total 140 acres of the land they currently farm, if they could raise £800,000 by July 1st 2006. If they fail to meet this target the land will go on the open market in September 2006 at the end of the current lease.

The land itself has been valued at between £450,000 and £1.5 million. 'It depends on what the land is being valued for,' explains Charlotte. 'It's the same with all farm land now. Prices are being driven up by the potential development value of future projects. In terms of what it's worth with what we're doing, ie farmland, then around £550,000 would be a reasonable figure.' But they have to raise a considerable amount more than that if they are to save the land and carry on farming. Luckily they have a plan.

Community ownership

The stay of execution won at the public enquiry in 2004 galvanised concerned local community members, and in a pivotal meeting in February 2005 Charlotte met Greg Pilley, local food consultant and project leader of the Community Farm Land Trusts initiative. Greg was there because, through the Fordhall team's tireless work, he'd heard about the project and it had captured his imagination. He suggested that Fordhall explore a unique new method to raise funds, as a Community Farm Land Trust.

'What we're talking about here is micro-democracy,' says Greg. 'Community

Farm Land Trusts democratises land ownership, reconnecting people with the land and the whole farming process.'

The Trust is a type of cooperative known as a Society for the Benefit of the Community, meaning that profits must be reinvested and cannot be divided, and its assets are protected. The Fordhall Community Land Initiative Limited rule document sets out very clearly the intentions of the project: 'To ensure farmlands managed sustainably for community benefit with the appropriate management for access, and to research sustainable farming through community land trusteeship, public involvement and other methods.'

> 'We have a unique opportunity here to change the direction of British farming, to place the farm and our food back at the centre of the community.'

As Charlotte explains, it works on a simple basis: 'On one level we have shareholders, of which we currently have 1,402. They purchase a share for £50 which makes them part owners of the land. They can then stand for nomination to the Trust Board (of Fordhall Community Land Initiative Limited) whose job it is to make sure that whoever uses the land sticks to an agreed set of guidelines. Fordhall Farm Ltd, which is me and Ben, then lease the land back from the Trust. So the land is community owned, with a very specific set of guidelines as to what can and can't be done with it, and we carry on as tenant farmers building on our dad's work.

'Each shareholder has one vote, regardless of the amount of shares they own, eliminating the prospect of someone wealthy taking control of the Trust.' Charlotte explains. 'In addition to shareholders, the Board has representation from Fordhall Farm Ltd and other local interest groups such as Shropshire Wildlife Trust.'

'We have people with shares in Australia, France, Ireland and the Netherlands, although our biggest concentrations are in London and the West Midlands. Really, these people are buying into an idea. They recognise the importance of the project and the need to get this kind of thing established.'

Besides direct financial support, Fordhall has approximately 200 volunteers working there at different times and, although some of them do travel from across the country, most are locally based. The volunteers have a variety of jobs and skills from manual labour on the farm to solicitors and land agents helping with drawing up contracts. They also have a mentoring scheme with 'troubled' local secondary school pupils. 'The idea is to get them into a positive environment, learning where their food comes from. In turn these pupils are mentoring infant school children visiting the farm.' Undergraduate students from local Harper Adams University College are also helping the farm develop fundraising tactics as part of their work towards their degrees in Rural Enterprise and Land Management.

Future plans

The precarious nature of Fordhall situation hasn't prevented them making plans for the future. Eco-builds, in keeping with the style of the current farm buildings but utilising energy saving designs and recycled material, for various diversifying projects are high up the agenda. Educational projects will take a high priority, with the building of a new bunkhouse and the creation of teaching and seminar rooms in the traditional farm buildings that dot the farm. Plans for tea rooms to draw in tourists not usually attracted to organic farms are being drawn up. The existing farm shop will be moved and extended to include a butcher and there's the possibility of a return to Fordhall's dairy making past. The farm buildings will also contain rooms

COMMUNITY LAND TRUSTS

The Community Farm Land Trust (CFLT) model that Fordhall is using is one aspect of a wider movement for democratic community ownership of the land through the mechanism of Community Land Trusts (CLT). This movement has its roots in the Co-operative and Charterists movement of the 19th century and has been central to several of the 20th century's great movements for freedom: the Gandhian movement in India revived this programme of radical land reform and Dr Martin Luther King helped set up the first Community Land Trust in the US. It works by land being bought by the community and taken out of the market, removing the possibility of speculation that would drive the price up. In this way assets are communalised and mutualised, and schemes such as affordable housing and office space can be developed.

'When you buy a house in a CLT you're not paying for the land, just for the house. That knocks 30-40 per cent off the price, and means that increase in land value doesn't effect the house price,' Greg explains. 'In England there is an increasing interest in Community Land Trusts for affordable housing. But as yet there's no interest in Farmland Trusts.'

In Scotland they have legislation, the Land Reform (Scotland) Act 2003, and an organisation, the Community Land Unit, specifically designed to enable community land purchases, and giving communities the pre-emptive right to buy. 'It's not ideal. They aren't an independent body, they are linked to the Scottish Executive, but it seems to be a more positive approach than what we are seeing here.' While there is no body within the England or Wales to facilitate community purchases, Greg points out that the National Trust has expressed an interest in taking on this role.

The re-emergence of community land ownership as a viable alternative represents a challenge to the twin failures of private and state ownership. With or without the backing of government legislation, the democratisation of land ownership is surely an essential component of any sustainable future.

www.communitylandtrust.org.uk
www.hie.co.uk/CommunityLand.htm

to lease out to projects that benefit the local community. The nature trail, which passes through fields where sheep and cows graze contentedly side by side, down past a pond near a small copse of budding trees, is already open to the public.

'We want to provide a complete experience for people who come here. As well as the buildings, we're going to expand to include community allotments, run as a Community Supported Agriculture scheme,' Charlotte explains. 'It'll be a total pasture to plate cycle, everything you need we'll be rearing and growing, and we'll be explaining how we do it.'

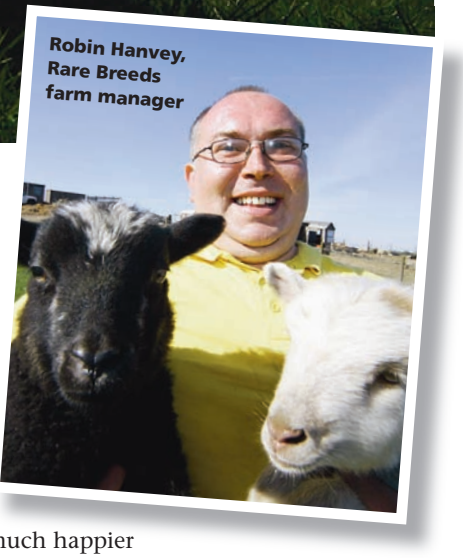
When asked about contingency plans should they fail to raise the money, Charlotte is determined that it won't come to that. 'We won't fail. Hopefully we can arrange loans or grants to meet any possible shortfall, but we need people to keep buying shares and getting involved.

'Raising the money will be a tall order,' says Greg. 'But we have a unique opportunity here to change the direction of British farming, to place the farm and our food back at the centre of the community.'

HELP SAVE FORDHALL FARM

This campaign cannot succeed without your help. The Fordhall Project represents a serious alternative to unsustainable, disconnected methods of farming. You have the chance to be part of the solution by supporting them.

To buy shares, and find out what other help you can offer, call Fordhall Farm on **01630 638696**, e-mail **project@fordhallfarm.com** or visit **www.fordhallfarm.com**.



RARE BREEDS FARM

For many Rare Breeds farm is their last resort - a safe haven from police, and social workers, and a chance to kick drugs and drink habits. **Nicki Sprinz** reports

The outhouses are in an appalling condition, the patchy fields don't inspire confidence, and the caravan, which acts as a shelter and temporary retreat during the lambing season, is rust-ridden. It looks more like a derelict waste ground than a working farm. I feel as though I've taken a wrong turning, but a ruddy-faced, cheerful man approaches with two lambs, several dogs and a trio of kids in tow. He extends his hand: 'Hi, I'm Robin.'

On the outskirts of an ordinary town in Fife, Scotland, a rather extraordinary man is making a difference. Three years ago Robin Hanvey was inspired to set up a community farm. He christened it Rare Breeds, a name that signifies both the type of animals who belong there and the kind of people who work there. He doesn't judge the girls who casually flit between swearing and smoking as they feed the lambs, or try and force a shy boy called Daniel to participate when he'd rather be alone. He just watches, listens and encourages the kids to do their best.

This is not your average farm; the volunteers who work here are a far from usual bunch of farm hands. Abandoned by their parents, rejected by their schools and community, for many this farm is their last resort, a safe haven from police, social workers and parental disappointment. Under the watchful eye of Robin, the farm manager, these kids are able to forget: forget attempting suicide; forget running away from home; and forget being sent as a teenager to a secure foster care unit.

As a son of a poultry farmer, Robin is very happy to be back working the land. 'I had the opportunity and experience to make this work. I never really suited the cut-throat business industry and am much happier supporting the kids and farming. It's a healthier way of life.'

From small beginnings

'We currently have one young Tamworth and one Large Black sow and our sheep are a mixture of Shetland, North Ronaldsay, Ryland and Wensleydale Longwool. We also have some Golden Guernsey goats and four Shetland cattle. The livestock has the shared use of around 15 acres. At the moment the daily tasks are quite light, but I hope to increase our capabilities with time. There are no plans to butcher meat on the premises yet. A number of local butchers have expressed an interest in doing the work, and there are other farm butcheries in Fife that have been approached and are willing

PHOTOGRAPHS BY **MICHAEL HUGHES & RICHARD SCOTT**

to co-operate.'

Spending time on the farm has dramatically altered the lives of the young people who volunteer here. Unable to find paid employment, some of the volunteers are put in touch with Robin by local career advisers. Most of the kids are keen to take advantage of the opportunity. 'We had real problems with attendance with two individuals,' says Robin. 'They were the kind of kids who clearly played truant at school and frankly they began to take the mickey. If it were up to me I wouldn't have minded so much, but ProjectScotland, an independent charitable organisation that finds voluntary placements for kids, has strict guidelines about the number of hours each volunteer must complete each week. In order to qualify for their £55 allowance they must volunteer for 30 hours per week.' I am introduced to three of the current volunteers.

After starting at the farm some 11 months ago, Daniel has managed to come off his medication. Aged 14 he attempted suicide four times and was hospitalised. Diagnosed with severe clinical depression he left school at 16, unable to face the prospect of continuing his studies. Yet he is clearly a bright boy – at GCSE level he was awarded seven As and one B, but depression rendered him incapable of continuing at school. He started working at the farm because he was unable to get a proper job. He now seems genuinely content.

'I spend my time looking after the animals, making sure they are all right, feeding them and doing general farm work,' he says. 'I was on the anti-depressant Seroxat for over three and a half years, but then I came here and I no longer have to take anything. Being here really helps. I intend to stay for as long as I can.'

A purpose in life

Daniel is now seriously considering a career in farming. 'Working here has been a real calling. I want to go to agricultural college. Being here has given me a taste for farming and I really want to stay and work here.'

Somewhat shy and retiring, the last four years have been a struggle for Daniel but working with the animals, taking responsibility for orphaned lambs and interacting with others gives him a reason to get out of bed each morning. He can finally see a future.

He tells me: 'I only get £55 a week as the budget is very limited here. I tried really hard to get a job before I came here. Employers don't look twice at you when you've been diagnosed with depression. It's really tough. I am the only one in my family to suffer from depression.'

Cheri is 17 years old. The worst of her teenage years were spent in a secure foster care home in Edinburgh and she has been in and out of homes throughout her life. She talks proudly of having successfully avoided being in trouble with the police for a year. Now she only buys alcohol at weekends and her weeks have a purpose. She loves the responsibility of caring for an orphaned lamb; finally someone has trusted her enough to be responsible for another being's welfare.

'I was always getting into mischief, causing riots, getting drunk and being reckless,' she says. 'All the local police know me. But now I only drink at

The patchy fields don't inspire confidence, and the caravan, which acts as a shelter and temporary retreat during the lambing season, is rust-ridden.

weekends and avoid getting into trouble.' Robin is very proud of the vast improvement Cheri has made over the past few months. 'She is calmer, less boisterous and not as cheeky.' Taking home an orphaned lamb for period of six weeks has patently had a huge impact on Cheri, she diligently provided round-the-clock care, weaning and nursing the animal whenever it required attention.

In an area where teenage pregnancy is rife, Robin firmly believes that caring for a lamb, which can cry out at unsociable hours of the morning and demands constant attention, offers an unrivalled insight into the complexities of looking after a baby. 'It's exhausting. If nothing else I think it acts as an effective deterrent for the girls. Now they have an inkling of what it means to be a mother and as a result I hope most of them will wait.'

Rare Breed farm volunteers - Cheri, Jodi & Daniel

Bureaucracy gone mad

Jodie is the newest addition to the farm. Recently she was at the centre of a media circus when the *The Sun* newspaper discovered that Fife Council was threatening to take action against her for keeping a lamb in her flat. The council argued that the lamb's presence in the flat was in breach of her tenancy conditions and asked her to make alternative arrangements for the lamb.

Panicked by letters from the council and the SSPCA, Jodie immediately returned Cookie, the orphaned lamb in her care, to the farm. 'I absolutely love animals,' she tells me. 'I would never do anything to harm them. The SSPCA accused me of putting Cookie's welfare at risk and said they would have to put her down. I thought they existed to protect animals.'

It seems Jodie was the victim of council bureaucracy. The caretaker, who in her words is 'a complete arsehole', reported the presence of her unconventional pet to the council and she was subsequently threatened with legal action and the possibility of eviction.

Watching her as she picks up the little animal, kissing and playing with it, Jodie's tenderness towards it is clearly visible. A council flat may not be the ideal home for an orphan lamb, but its welfare should never have been doubted. Jodie would never do anything to hurt Cookie, she is besotted with her.

Jodie is also familiar with the Scottish care system: after a fight with her mum, she was put in care, aged 13. Unhappy and misunderstood, she ran away and ended up living in a tent for several months.

'I had a huge row with my mum and couldn't stay at home. I hated foster care, so running away seemed my only option. Like Cheri I drank a lot, played up at school and generally caused havoc wherever I could.'

She is now studying IT at her local college and lives on her own in a council flat in the area. In spite of her initial deviancy, Jodie seems to have overcome her troubled background.

Benevolent landlord

Daniel shows me round the farm. It's small, but the project is lucky to be there. They are all conscious of the fact that they exist at the grace and favour of the Ernest McPherson, who owns over 600 acres in Fife and is chairman of Lochgelly Community Council. His name prompts a mixed reaction among the locals. For some he is a source of employment and business, but for others he embodies the threat of an excessively powerful landlord. A man of few words, Ernest tells me he wholeheartedly endorses Robin's

work and admires his community-minded spirit. His continuing goodwill is essential to the continuation of the Rare Breeds farm. Robin thinks that Ernest's empathy and sensitivity stem from his own experience of depression.

'Although Ernest has been very generous to us, we cannot expect him to allow us to use his land for nothing indefinitely. I imagine at some point he will want to reclaim the fields for his own animals, so I am consciously trying to plan ahead.'

'It's very hard to get funding,' he explains. 'Last week my latest application for funding from Fife Council was knocked back. I had hoped to get enough to actually employ a farm manager and offer a couple of the volunteers permanent salaried jobs, but I continue to reach a dead end. Even if your project is eventually approved, bureaucratisation moves in and suddenly the reins are held by someone else who is entirely disconnected from the project.'

Frankly, it is amazing that Rare Breeds has failed to gain the council's support given the recent reports detailing the levels of deprivation and unemployment in the area. The closure of the mines in Fife has led to high unemployment and significant social problems such as drug abuse. Unsurprisingly, Fife has one of the highest teenager pregnancy rates in Scotland. Although the figure has fallen substantially in the last 10 years, it is still alarmingly high at 42.5 per 1000.

There are around 20,000 unemployed people in Fife, of whom a third are recovering from a mental illness and who will face barriers if they choose to return to work. Those who have suffered from depression or have a criminal record will be all too familiar with the intense opposition that can be encountered when looking for work. Autism and depression still carry a strong social stigma; people are scared by what they cannot understand and employing an individual with a history of depression is a risk most employers are too afraid to take.

ProjectScotland provides Robin with the volunteers and gives each kid a meagre weekly allowance, which crudely translates into fag and beer money for the majority. Robin doesn't encourage idleness: 'Most of the volunteers recently completed a two-day course in lambing. During the season we used the caravan as a very basic kind of B&B because the lambs need round-the-clock care. It is a chance for the kids to witness the creation of new life and be intimately involved in the process. It's really good for them.'

Financial support

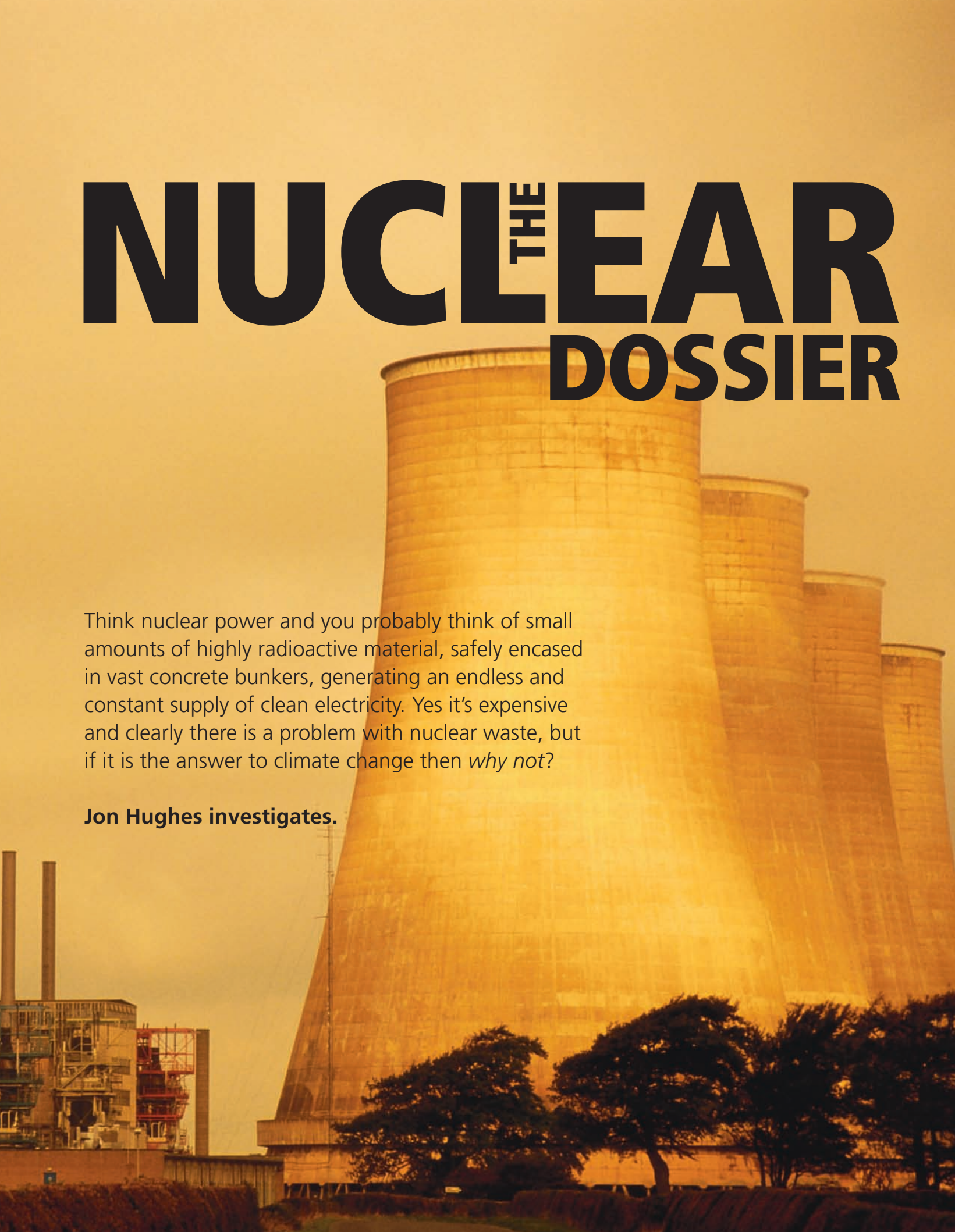
The project is ambitious. Few have the vision let alone the courage to employ difficult and rejected teenagers, but Robin is determined. 'I am convinced of the therapeutic effect that working with the land, and with animals, can have on people with mental health problems. By 2007, I want to have between eight and 10 supported work placements operating here. As the project evolves I hope to employ three permanent staff as well as 20 or so volunteers. But for all of this I need funding.'

It is hard to imagine a more worthwhile project. Just one afternoon on the farm is all that is required to see what a positive impact this independent initiative has had on these neglected and troubled kids. Caring for a lamb, including performing its castration, forces these kids to grow up and take responsibility for their own actions. By working with Robin the quality of life of these volunteers has undeniably improved.

But I am uncertain about the farm's future. Inspired by the teenagers I have met I am aware the farm cannot exist on goodwill alone. They are in desperate need of funding and support. Fife is home to numerous kids like Cheri and Jodie who are on benefits, de-motivated and binge-drinking. Rare Breeds offers an alternative, but without financial support nothing will change.

If you can offer help, financial or otherwise, please contact Robin Hanvey on **01592 860 400** or email him at **rhanvey62@yahoo.co.uk**

THE NUCLEAR DOSSIER



Think nuclear power and you probably think of small amounts of highly radioactive material, safely encased in vast concrete bunkers, generating an endless and constant supply of clean electricity. Yes it's expensive and clearly there is a problem with nuclear waste, but if it is the answer to climate change then *why not*?

Jon Hughes investigates.

BUILDING A NUCLEAR POWER STATION

During construction climate change is the only thing nuclear power fuels - to the tune of 20 million tonnes of $C0_2$ for each reactor

Once a decision has been taken to build a nuclear power station, the question of location arises. Firm foundations are required for a building that has to surpass an 'Acts of God' insurance policy for at least 100 years. It also pays for it to be built close to a plentiful water supply, as it requires 30 million gallons daily to act as a coolant to stop generators overheating and prevent catastrophic meltdown. This is a fundamental problem. Sea levels are predicted to rise by half a metre by the end of the century, according to the the ultra-cautious International Panel on Climate Change. It could be less, but it could easily be more. Such a rise threatens every coastline in Britain and around the world, as it brings with it unpredictable weather patterns.

Late last year, a confidential report from Nirex, the then government agency on radioactive waste management, warned that all the UK's current reactor sites are at risk of flooding or erosion under such conditions. If the Greenland and Western Antarctic ice sheets start melting away, as some experts now predict, sea levels could eventually increase by as much as 12 metres.

Given this, it would not be possible to construct new reactors on old sites, which has been viewed as the ideal option. The 'piggy backing' would have circumvented the need for new planning permissions and a public inquiry. As it is, new sites will have to be developed further inland.

To find the right location, geological surveys are undertaken to assess the long-term viability of the land, and answer questions like will it buckle in the event of a long-term drought or sink in the event of an excessive wet period.

In the UK, the industry faces serious logistical problems. On this narrow and densely populated island, where can a new reactor be sited that is away from the coast but near a plentiful water supply and, politically at least, remote from major conurbations? It is easy to speculate where – the Lake District, the Pennines, the Highlands of Scotland – but such remote locations are a major headache for the industry on two counts. First, infrastructure. Developing a remote site would involve a major road building programme; the facility would have to be hooked up to secure power and communication networks, for security

PHOTOGRAPHS BY **CORBIS & REUTERS**

reasons probably via underground networks; and a water source tapped into or created, which raises the spectre of dams being constructed.

These are all energy intensive projects that massively dent any emissions benefits promised during the reactor's generating life and will add dramatically to the costs. A study by the Rand Corporation found that the estimated costs of complex civil engineering projects involving new technology have always escalated by the time of completion, by a factor of between 2-5. Within the nuclear industry, cost escalations with a factor of 10 are not uncommon.

Secondly, being remote increases the amount of electricity that is required to deliver it to consumers, and increases the amount lost through natural wastage en route.

Supposing all these issues are overcome to the satisfaction of the government of the day, wagons will start to roll. Fleets of them. A study for the Canadian nuclear industry gives an indication of what's involved. Millions of tonnes of steel (1.6 million) and concrete (14 million) need to be manufactured and delivered to the chosen site. This means hundreds of lorries, consuming millions of gallons of diesel, will thunder towards the site every day during the construction period. The immediate environmental impact will be immense. Tyre dust is more damaging to public health than exhaust fumes, but of course the latter exacerbates climate change. According to the Sustainable Development Committee, for every tonne of Portland cement manufactured, a tonne of $C0_2$ is released into the atmosphere. The same goes for steel. Core reactor parts will most likely be manufactured in Japan and shipped over.

All of this only hints at the enormity of the project. A nuclear power station is not a singular building as the name implies. It is a facility comprising of around 10 auxiliary buildings, which act as the central nervous system for the reactor. The eventual footprint of any facility will be between 500-1,000 acres, including the exclusion zone.

This is merely an approximation of what is involved. The building of a nuclear power plant is a complicated and lengthy process. The prototype European Pressurised Water Reactor (EPR) being built at Olikuoloto in Finland had been 15 years in development by the Franco/German consortium Areva/Siemens before being presented to the Finnish authorities for approval in 2004. Ignoring the political chicanery that has allowed it to progress to construction in one year, in engineering design terms the reactor can't possibly have been designed with a 9/11-style terrorist attack in mind. In a highly critical report of the EPR for Greenpeace, John Large of engineering consultants and nuclear analysts, John Large Associates, says in engineering terms it would take at least 10 years to address and resolve such an evident threat, which he describes as a 'probability, no longer a possibility'.

Although the EPR will, in all likelihood, be used as a blueprint for any UK reactor, it will be far from proven technology. 'Innovative' computer systems are being designed to manage the reactor in the event of an emergency shut down, precluding human override. Given the failure of computer systems to manage the NHS, Child Support Agency payments and farmers' subsidy payments in the UK (to name but a few), it takes a huge leap of faith to believe that a prototype system will work perfectly from the outset. Computer programs only reflect what is known and are not responsive to events that lie outside the designer's knowledge. With a hugely complex nuclear facility, where even a lose screw or dodgy nozzle can prove catastrophic, there are trillions of potentially fatal permutations.

So 'advanced' is the technology that no testing facilities exist for some major components, so we won't know for certain whether the reactor is up to the job until it's on the job.

As no nuclear reactor has been built on mainland Europe for 10 years, and the last to be built in the UK was nearly 20 years ago – nearly 30 years ago in the US – who has the expertise to build a reactor, let alone regulate it? 'It's a real life nuclear experiment,' says nuclear expert Harry Lami of Greenpeace.

It can be assumed from the EPR that scheduled build time for any new reactor will be set at an ambitious five years. (One year in, Olikuoloto is nine months behind schedule.) During the construction period, greenhouse gases will be spewing into the atmosphere, fuelling nothing other than climate change. Much of the £2bn it is conservatively estimated a nuclear power station will cost is spent on sourcing the raw materials, their manufacture and their supply, all of which are processes that use energy and cause $C0_2$ emissions to rise. If the UK government opts to keep nuclear power supplying 20 per cent of the country's energy needs, then it is probable that 10 such reactors would have to be built. (Worldwide, 80 new reactors are envisaged.) This is environmental damage that can't be repaired, and will only intensify the process of climate change now.

Hundreds of lorries, consuming millions of gallons of diesel, will thunder towards the construction site every day

OPPOSITE: All the UK's current reactor sites including: Hunterston in North Ayrshire, Dounreay in Caithness, Bradwell in Essex, Berkeley in Gloucestershire, Dungeness in Kent and nine in England and Walesare at risk of flooding or erosion as sea levels rise. Sellafield in Cumbria and the nearby radioactive waste dump at Drigg are also highly vulnerable to coastal erosion.

URANIUM MINING & MILLING

Remote, unregulated and... running out. Why the business of fuelling nuclear power can't give us energy sovereignty

Once construction is under way, the business of sourcing uranium to fuel the reactor starts. The problem is that uranium doesn't sit neatly in the ground in ready-to-use packages, it has to be mined and milled – both environmentally destructive processes. While the element is found everywhere on earth, geological surveys show that most deposits of uranium are found in concentrations of about 0.02-0.01 per cent (200-100g per tonne of rock).

This means that round 98,000 tonnes of rock has to be mined and milled to give up one tonne of uranium. A standard 100mw/eh nuclear reactor requires in the region of 160 tonnes of uranium fuel – processed from around 16 million tonnes of rock – each year. At these levels of concentration, mining and milling uranium is uneconomic and uses more energy to recover than it will ultimately produce.

> The cavalier regulation of mines has been cruelly exposed. In the 1980s highly radioactive waste was used to build homes in America

Uranium is taken from the earth like any other raw material: blasted and dug from open pits, causing thousands of tonnes of radioactive rock to be disturbed, the dust of which finds its way into water, plants, animals, fish and humans for hundreds of miles around. Sometimes these pits can be 250 metres deep. When they are, polluted surface water has to be pumped away from the mine to keep it operational, further contaminating local water supplies.

Worse is to come at the mill, which is a chemical plant by another name. Here huge diesel-powered machines crush the rock into a more manageable size ready for leaching. In most cases, sulphuric acid is used as the primary leaching agent. As this not only extracts uranium from the ore, but also several other constituents like molybdenum, vanadium, selenium, iron, lead and arsenic, the uranium must be separated out of the leaching solution. The final product from the mill, commonly referred to as 'yellowcake', is packed in casks ready to be shipped to the purchaser.

The leaching process only ever extracts around 90 per cent of the uranium, the rest remains in the waste rock, which is known as tailings. Sometimes leaching takes place 'in situ'. This involves pumping hundreds of tonnes of sulphuric acid, nitric acid, ammonia and other chemicals into the rock strata and then pumping it up again after some 5 to 25 years. In situ leaching is fast becoming the industry's preferred method because it is cheaper. But it is also wasteful, yielding only about a quarter of the uranium from the treated rocks. The end result is the same – vast amounts of radioactive and toxic metals are dumped into the local environment and aquifers.

Dumping the waste

The uranium mill tailings are normally dumped as a sludge in special ponds or piles, where they are abandoned. The largest such piles in the US and Canada contain up to 30 million tonnes of solid material. In Saxony, Germany, the Helmsdorf pile near Zwickau contains 50 million tonnes, and in Thuringia, the Culmitzsch pile near Seelingstädt has 86 million tonnes.

The amount of sludge produced is nearly the same as that of the ore milled; at a grade of 0.1 per cent uranium, 99.9 per cent of the mined rock is left over. This contains all the constituents of the ore and 85 per cent of its initial radioactivity, as long-lived decay products such as thorium-230 and radium-226 are not removed, and up to 10 per cent of the uranium is never captured. In addition, the sludge contains heavy metals and other contaminants, such as arsenic, and residual chemical agents used during the milling process.

Mining and milling removes hazardous constituents in the ore from their relatively safe underground location and converts them to a fine sand, making the hazardous materials more susceptible to dispersion in the environment.

By rights this waste should be treated: the acids should be neutralised with limestone and made insoluble with phosphates; the mine floor should be sealed with clay before the treated tailings are put back into it; the overburden should be replaced and the area should be replanted with indigenous vegetation. In practice, all this is rarely done. It is expensive, and according to Ceedata, a renowned environmental consultancy, it also requires approximately four times the amount of energy that was needed to extract the ore in the first place.

The cavalier regulation of mines has been cruelly exposed. In the 1980s in America, highly radioactive tailings were used in building homes, dramatically increasing the cancer rate amongst the inhabitants. Similar abuses have taken place in Eastern Siberia in the 1990s. As mines are often found in remote locations, so they are almost impossible to police and regulate. And just as unscrupulous builders can use the tailings, so, too, could the potentially lethal yellowcake fall into the wrong hands.

The Navajo legacy

Having experienced the mining and milling process first hand, the Navajo nation has said, 'Never again'. They know from experience what a poisonous business it is. In the 1950s, uranium mines were opened across the Navajo nation, leaving a legacy the current tribal president Joe Shirley Jr describes as 'genocide'. Dozens of premature deaths of Navajo miners and passed-on genetic defects have been attributed to uranium exposure from that time.

'You look around the reservation and see so many elderly people who are crippled and can barely breathe,' said Robert Stewart Sr, a Navajo who worked for five years in a mine in the mid- to late 1950s. 'This pretty much devastated much of a generation.'

Navajo chiefs have understandably outlawed a return of mining to their reservation, which covers 27,000 square miles across parts of Arizona, New Mexico and Utah.

Hydro Resources Inc, however, is expected to fight the ban. The mining company says there are nearly 50,000 tonnes of uranium reserves on the reservation, which they want to mine using the in-situ leaching method.

Around the world there is a backlash against uranium mining. Australia has the largest deposits of uranium ore in the world, with 40 per cent of an identified 3.5 million tonnes – enough, the industry say, to fuel current world nuclear capacity for another 45-50 years. Opposition to this environmentally destructive business has restricted companies in Australia to mining just 10 per cent of the reserves and the Australian government has just awarded the Aboriginal owners and Kakadu national park the right to veto mining there, setting a precedent for the Northern Territories where most of the country's reserves of ore are.

> Uranium is a finite fuel... If nuclear capacity doubles in size, then the ore is going to run out in twenty years

There is, however, a more pressing problem for industry. Urnaium is a finite fuel and it is running out. Nuclear power currently generates 2.5 per cent of the world's electricity supply. In industrialized countries, such as the UK, US and Japan, nuclear generates in the region of 17-20 per cent of electricity. All these countries are talking about increasing their nuclear capacity. The government's chief scientist Sir David King has talked about doubling capacity in the UK, to around 30 per cent. Japan envisages building another 30 reactors, the US around 10-15. If nuclear capacity doubles in size, then the ore is going to run out in 20 years.

Under such circumstances there is no guaranteed price stability. The spot market price has risen 600 per cent in the past four years amid talk that nuclear capacity is to double in size.

In turn there will be no security of supply. Outside of Australia the other 60 per cent of the world's reserves of ore are, in order of size, divided between Kazakhstan, Canada, South Africa, Namibia, Brazil, the Russian Federation, America, and Uzbekistan. As a uranium shortage looms, it is unlikely that nuclear nations such as America, Russia and Canada will sell their uranium, which means the UK will be reliant on supplies from less stable sources. Having made

Uranium is taken from the earth like any other raw material: blasted and dug from open pits, and spreading radioactive dust over water, plants, animals, fish and humans.

such a capital investment in nuclear, we would be a hostage to fortune. Creating an electricity supply around a fuel that is known to be running out gives us no greater energy sovereignty than we would get from relying on the Middle East for oil or Russia for gas.

Understandably, the nuclear industry is seeking to assure its potential markets that any uranium shortage will be addressed. To that end it has been looking at alternative sources: notably, extracting uranium from granite and seawater. Both are fantastical.

Granite has an average uranium content of four grams per tonne. To supply one nuclear power station with uranium for one year would require around one million tonnes of granite. This would leave a heap of granite tailings (if neatly stacked) 100 metres high, 100 metres wide and three kilometres long. Ceedata say the process would use 30 times more energy to extract the uranium than it would eventually produce.

Seawater is promoted as another option. This involves using nets in the ocean to fish for uranium, and a five-stage chemical process to clean, separate and prepare it for use. The process is so complicated that it would take three times as much energy to source as it would eventually produce and involve the use of highly-polluting chemicals.

The other hope is that fast-breed reactors will come on stream. These are reactors that create their own fuel while they generate electricity. It was the promise of this technology that led to the claim 50 years ago that nuclear power would generate electricity 'too cheap to meter'. The problem is that fast-breed reactors have never worked.

'Breeding' involves three complex operations working in conjunction: breeding, reprocessing and fuel fabrication, which has never been achieved. The process causes waste that clogs and corrodes the equipment undertaking it. There are three fast-breed reactors in the world: Beloyarsk-3 in Russia, Monju in Japan and Phenix in France. Monju and Phenix have long been out of operation; Beloyarsk is still operating, but it has never bred.

Nevertheless, the nuclear industry still believes fast breed technology holds the answer to future electricity supply, using thorium as a fuel. Ceedata estimates this technology, which relies on uranium and plutonium as a start-up fuel, could theoretically double in size every 40 years. So if we use uranium and plutonium to fire up two thorium reactors today, in 40 years they would have made enough fuel to start another two. This accepts the technology is ready, which it is not. The most optimistic forecast is that this technology might be ready in 20 years.

All the while, greenhouse gas emissions will be being released into the atmosphere. A 1998 study for the Canadian nuclear industry found that for every unit of usable uranium recovered, 20 units of CO_2 are released into the atmosphere. This figure is generous to the industry, as it is based on extracting particularly high grades of uranium, of around one per cent.

As most deposits of uranium in the world are found in concentrations of about 0.02 per cent or less, the true picture is far more corrosive. According to Ceedata, as soon as it becomes necessary to mine ores of below 100g per tonne, more CO_2 is emitted into the atmosphere than any emissions savings a nuclear power station could make over a 24-year generating life.

Melbourne pupils join a nationwide student protest over the mining of uranium adjacent to a national park in the country's far north that will damage the land and dispossess traditional Aboriginal owners.

Milled uranium is commonly called 'yellowcake', which describes its characteristic appearance. It still has a long journey to take – both in terms of processes and physically – before it can be used in a reactor. At the milling plant the yellowcake is packed in drums and shipped to a conversion plant. This is a highly risky business, because while yellowcake is the key ingredient for creating nuclear fuel, it is also a key ingredient for making nuclear weapons. It is worth considerably more than its weight in gold on the black market.

CONVERSION & ENRICHMENT

The secretive side of nuclear power that uses chemicals 10,000 times more potent greenhouse gases than CO2...and is fuelling a nuclear arms race

Enrichment is a process similar to distilling. Yellowcake contains only about 0.7 per cent uranium-235, the vital ingredient for nuclear fission. In order to bring the concentration of uranium-235 up to the required 3.5 per cent, the oxide is mixed with fluorine and heated to form uranium hexafluoride, a gas commonly known as 'hex'. While in this gaseous state the lighter molecules of uranium-235 are separated from the heavier uranium-238 by forcing them through a membrane with tiny openings. As it cools the enriched uranium returns to a solid state and is ready for conversion into fuel rods.

The remaining 85 per cent, on cooling, becomes what is known as depleted uranium. It ought then to be placed in sealed containers for final disposal in a geological depository. However, owing to the cost of doing this, and the scarcity of suitable places for it, much of it is held in interim storage: in the United States, during the last 50 years, 500,000 tonnes of depleted uranium have accumulated in cool storage (to stop it becoming gas), designated as 'temporary'. The UK is estimated to have 30,000 tonnes of depleted uranium stored around the country in 10 tonne casks.

Contamination issues

Enrichment plants are highly toxic environments, using myriad chemical compounds such as fluorine and chlorine alongside other solvents. Around half a tonne of fluorine is used to turn one tonne of uranium into hex. The global warming potential of fluorine and its halogenated compounds is nearly 10,000 times that of $C0_2$. While the nuclear industry keeps no records of such emissions, there can be no doubt that substantial amounts enter the atmosphere. In the US, the government owned US Enrichment Corporation is to pay £7bn over the next 50 years cleaning up after its two enrichment plants. Throughout the 1980s and 1990s both were exposed for releasing radioactive waste and cancer-causing chemicals into the environment.

> Mines and mills use their remoteness as security, but this could also hide a multitude of sins

In Ohio, the soil and underground water around the Piketon plant was found to be extensively contaminated with such cancer-causing chemicals as trichloroethylene, a solvent, and PCBs. It estimated that each day the cooling towers released 30 to 40 pounds of chromium, a toxic and cancer-causing element, into the air.

Another plant in Kentucky has an even worse rap sheet. *The Washington Post* reported that between between 1952 and 1987, 61,000 pounds of radioactive uranium flowed out of the Paducah plant and into the Ohio River. In 1988, aquifers near the plant were found to be contaminated with

An armour piercing shell tipped with depleted uranium - a waste product of the enrichment cycle, commonly used in armaments.

technetium and chemical carcinogens, which prompted a multimillion-dollar clean-up operation led by the US Environmental Protection Agency (EPA).

When it has left the enrichment plant, the uranium has to go through further chemical processes at a fabrication plant. This is where it is converted into ceramic pellets of uranium dioxide and packed in zirconium alloy tubes to make fuel rods, which are finally bundled together to form fuel assemblies for reactors. Zirconium alloy is another mineral that has to be mined and purified for use in the fuel fabrication process.

This is yet another heavy duty chemical process for which the nuclear industry doesn't keep figures on emissions. However, all such plants rely heavily on air and water filters to stop such deadly emissions reaching the environment. When environmental tests were conducted round a fabrication plant outside St Louis in America, the monitoring well was found to be contaminated with radioactive technetium-99, a radioactive and potentially carcinogenic by-product of nuclear fission known to enter the thyroid gland and intestines.

Piracy risks

Mines and mills use their remoteness as security, but this could also hide a multitude of sins. We only know how much ore has been milled from the mine records. In politically unstable, impoverished countries, such as the former Soviet Union, where weapons grade plutonium has found its way onto the black market, there is clearly a potential for milled uranium to be diverted or hijacked en route to the enrichment plant.

All the processes required to prepare the fuel for a nuclear power station don't occur in the same location. The Australian uranium industry describes a typical journey for yellowcake destined for Belgium: first it is shipped to the US for conversion to uranium hexafluoride; the 'hex' is then sent from the US to Russia for enrichment, then on to a fuel fabrication plant in Germany to be turned into uranium dioxide, before going into the core of a reactor in Belgium. The opportunity for piracy is all too apparent. It is a problem the International Atomic Energy Agency is aware of, but is finding increasingly difficult to police as the number of enrichment plants in the world increases.

In 1983, the prestigious Stockholm International Peace Research Institute (SIPRI) called for a worldwide ban on centrifuge enrichment technology because of its potential for nuclear proliferation. In its book *Uranium Enrichment and Nuclear Weapon Proliferation*, SIPRI said that existing centrifuge facilities 'should be shut down and dismantled'. If that were impossible, then SIPRI recommended that the facilities be 'internationalised' and 'managed in such a way as to prevent the further dissemination of this process... the objective should be to phase out the gas centrifuge technique for uranium enrichment.'

SIPRI's recommendation fell on deaf ears. At that time only three commercial-scale centrifuge enrichments plants existed, all owned by the European consortium Urenco. Now the technology has spread to at least 10 countries, most of which obtained the technology either directly or indirectly from Urenco.

The first nation to do so was Pakistan, after Abdul Qadeer Khan famously stole centrifuge blueprints from Urenco and used them as the basis for Pakistan's successful programme to develop and produce nuclear weapons. The respected Nuclear Information and Research Service says these blueprints were then made available for sale.

Only this year, not only Iran but also Brazil became countries with enrichment capabilites. An American consortium is currently building such a plant in New Mexico, at a cost of $1.4 billion. The problem is that price or expertise is proving no barrier to any state determined to have an enrichment plant.

'We just cannot continue business as usual, in that every country can build its own factories for separating plutonium or enriching uranium,' Mohamed El Baradei, head of the International Atomic Energy Agency warned late last year. 'Then we are really talking about 30, 40 countries sitting on the fence with a nuclear weapons capability that could be converted into a nuclear weapon in a matter of months.'

OPERATION & MAINTENANCE

While the world worries about a terrorist attack on a nuclear power station, industry chiefs have identified an even greater threat - staff boredom

Perhaps surprisingly for an industry that prides itself on cutting edge technology, nuclear reactors aren't very efficient. They rarely operate to capacity, so although they are generally designed and licenced to operate for 40 years their actual generating life is nearer 24-years. Essentially, nuclear power stations work in pretty much the same way as fossil fuel-burning stations, except that a 'chain reaction' inside a nuclear reactor makes the heat instead. The reactor uses the fabricated uranium rods as fuel, and the heat is generated by nuclear fission. Neutrons smash into the nucleus of the uranium atoms, which split roughly in half and release energy in the form of heat. Carbon dioxide gas is pumped through the reactor to take the heat away, and the hot gas then heats water to make steam that drives turbines, which in turn drive generators.

The reactor is controlled with 'control rods' made of boron, or by including boric acid in the coolant water. Boron acts to slow down the fission process by absorbing neutrons. To generate more power, the presence of boron in the reactor is reduced, allowing more neutrons to crash into uranium atoms. Boric acid is produced mainly from borate minerals by reaction with sulphuric acid in a chemical process similar to milling and enriching uranium.

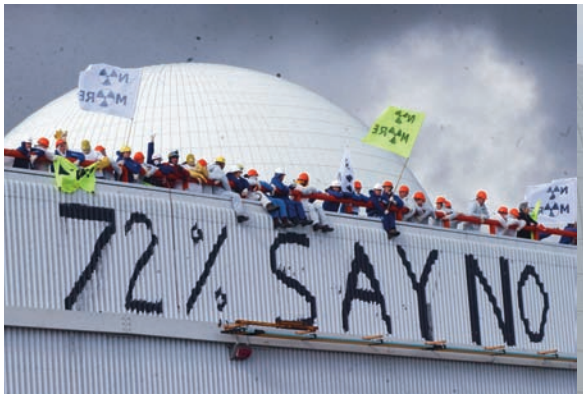
British Nuclear Group employs approximately 30,000 people full time, and 30,000 people indirectly, as sub-contractors, to run the 14 nuclear reactors in the UK. Sellafield alone employs around 10,000 full-time staff and 4,000 sub contractors.

The thousands of staff employed to run nuclear facilities are there to refuel the reactor, monitor its performance and, when required, to perform running repairs.

Refuelling is a major operation that occurs on average every 18 months and requires the reactor to be shut down for about 40 days, although some reactors can refuel on the job. Fuel rods have a natural fission life of around four to five years, after which they simply wear out. At this time the core pressure reactor is shut down and allowed to cool, before the 60,000 fuel rods that form the payload are removed. Thousands of fuel rods, which are commonly around 3.5-4m long, are used to form a fuel assembly, which is an open lattice that can be lifted into and out of the reactor core. Between one quarter and a third are removed at any one time and replaced, as the rods wear down at different rates depending on where they sit in the lattice.

During routine operations and refuelling 'small' amounts of radioactive isotopes such as hydrogen-3, carbon-14 and plutonium-239 are routinely leaked into the atmosphere in what are known as

Security is critical yet twice in 2003 Greenpeace entered Sizewell B, gaining access via a fire door into the inner secure zone. In 2004-2005 the Office of Civil Nuclear Security recorded another 40 cases of potential security breaches in nuclear facilities.



'licenced emissions' and 'controlled releases'. These occur for many reasons:

■ fuel rods emit radiation into the atmosphere during refuelling, and this is filtered out of the facility through air vents;

■ pipes, tanks and valves leak as, in engineering terms, there is no way to perfectly seal them;

■ mechanical failure and human error can also cause leaks;

■ as a nuclear plant ages, so does its equipment – and leaks increase;

■ some contaminated water is intentionally removed from the reactor vessel to reduce the amount of radioactive and corrosive chemicals that have built up during fission and could damage valves and pipes. The water is filtered and then either recycled back into the cooling system or released into the environment;

■ some radioactive fission gases, stripped from the reactor cooling water, are held in decay tanks for days before being released into the atmosphere through filtered rooftop vents; and

■ some gases leak into the power plant buildings and are released during periodic 'purges' and 'ventings'. These airborne gases contaminate not only the air, but also soil and water.

While the industry has always said that these releases are at levels too insignificant to effect human health, and the regulatory authorities accept they are permissible, CERRIE, a government committee established three years ago to look into the health impact, thought otherwise. (See 'Licenced Emissions and Controlled Releases', p51)

The potential hazards were all too clearly exposed when pigeons that had been roosting at the Sellafield reprocessing plant were found to be highly radioactive – 40 times the EU intervention level. The then Ministry of Agriculture warned against handling, slaughtering or eating any pigeon found within 10 miles of the facility.

Industry describes operational failures as 'inexplicable'. What they mean is a succession of errors occurred that had not been envisaged

At some facilities, plutonium is extracted from the spent fuel rods for reprocessing. This involves bathing the rods in a succession of chemical baths, containing at various times boiling nitric acid and caustic soda, among other solvents. These too give off radioactive gases, which the industry claims are captured. As no records are kept, it's impossible to prove either way.

What is known is that it is a highly dangerous operation. In April 2003, the Paks nuclear reactor in Hungary came within seconds of a nuclear explosion comparable to Chernobyl. About 30 fuel assemblies – one tenth of the reactor core load – did not cool down sufficiently after being chemically cleaned during refuelling. Instead, they boiled the water in the cooling tank dry and finally crumbled like porcelain when operators flooded the tank with water. A massive release of radioactive gas leaked into the reactor room, from which operators fled, and was later blown unfiltered into the atmosphere at full ventilator strength for more than 12 hours.

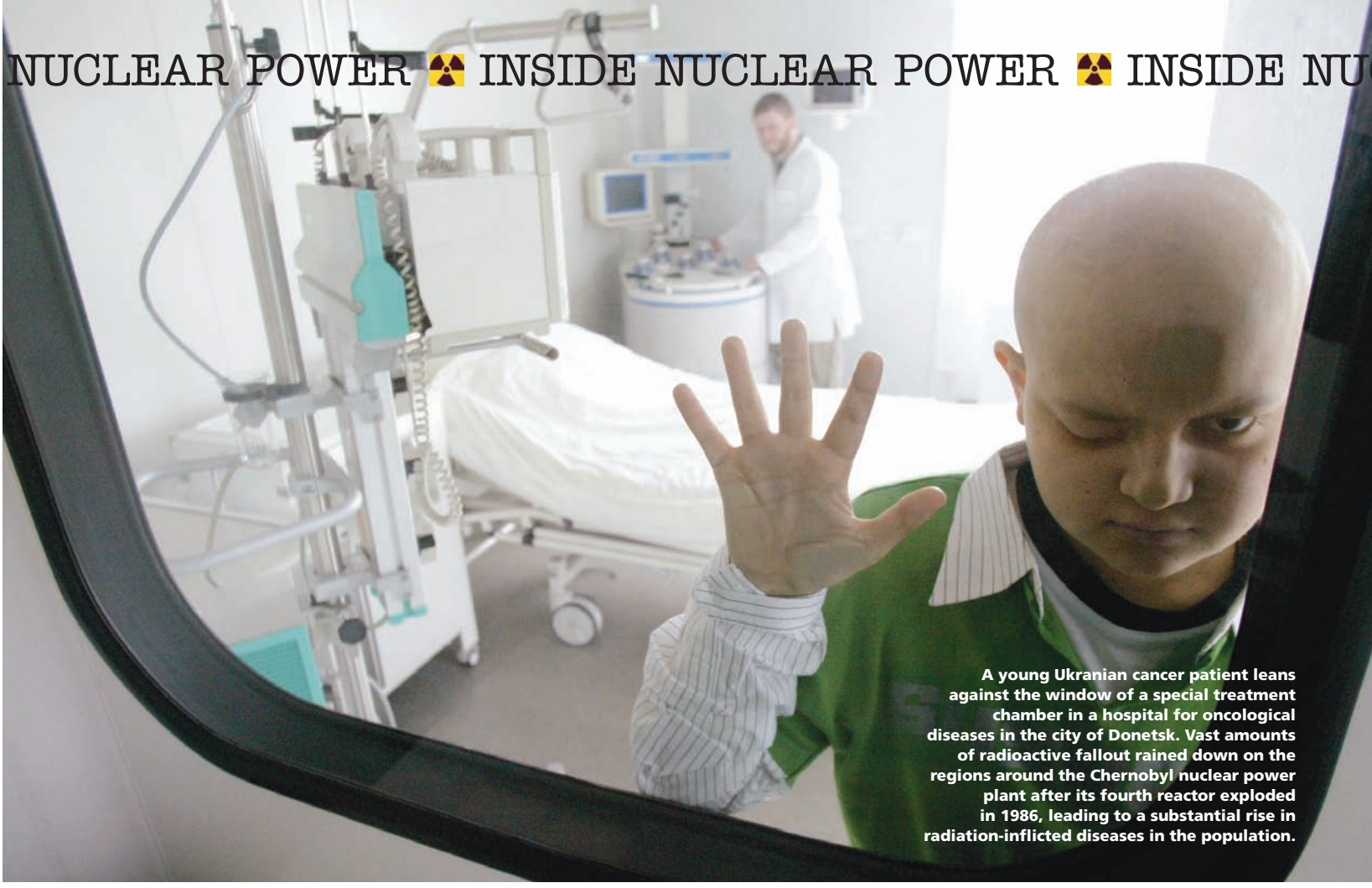
While human error might have contributed to the Paks 'incident', it is more indicative of a malaise that is known to be pervasive in the industry – inattentiveness. In May 2005 it was revealed that thousands of litres of highly radioactive liquid had been leaking unnoticed at the Thorp reprocessing plant in Sellafield for nine months. By that time, 83,000 litres of radioactive coolant – enough to fill an Olympic-sized swimming pool – had already been accidentally spilled, with an estimated clean-up cost of £500 million.

British Nuclear Group, which runs the plant, said workers had failed to respond to indicators that would have warned that there was a leak.

In America in 2001 warning signs were missed that indicated boric acid corrosion had eaten through the reactor wall. Between 35-40 pounds of carbon steel were gone, and the only thing that contained the radioactive, highly-pressurised coolant water inside the vessel was the thin skin of stainless steel cladding. Not designed to endure such pressure, the lining had started to bulge outward. It was only identified when regulators became concerned about the design of the nozzles that delivered boric acid to the reactor. If it had continued to go unnoticed, the results would have been catastrophic.

The industry describes such events as 'inexplicable'. What they mean is a succession of errors occurred that had not been envisaged. While publicly they reassure that the industry is safe, privately there is grave concern for the future.

When the World Association of Nuclear Operators (WANO) met in Berlin in 2003, 'carelessness and complacency' by operators was at the top of the agenda. Both 'threaten the continued existence of our business,' *Nucleonics Week* quoted a Swedish delegate as saying. The then President of the WANO, Hajimu Maeda, diagnosed a 'terrible malaise' that threatened the business from within. It starts with loss of motivation, complacency and 'carelessness in upholding a culture of safety due to severe cost pressures resulting from deregulated electricity markets'. If these problems are not recognised and countered, he warned, 'a serious accident will destroy the industry'.



A young Ukranian cancer patient leans against the window of a special treatment chamber in a hospital for oncological diseases in the city of Donetsk. Vast amounts of radioactive fallout rained down on the regions around the Chernobyl nuclear power plant after its fourth reactor exploded in 1986, leading to a substantial rise in radiation-inflicted diseases in the population.

LICENCED EMISSIONS & CONTROLLED RELEASES

Stop worrying about major accidents such as Chernobyl, nuclear reactors legally emit radioactive particles that are causing cancer clusters to erupt around the country

Radioactive pollution doesn't just leak from nuclear installations in emergencies and accidents. It is emitted from them, legally, every single day. These licenced emissions and controlled releases are necessary for the proper functioning of nuclear facilities and they release into the atmosphere and the environment a range of dangerous cancer-causing radioactive particles.

Since the discovery of cancer clusters around the Sellafield nuclear reprocessing plant in 1983, several studies have revealed similar clusters around other nuclear facilities in and around the UK.

Clusters of childhood cancer, where the risks are anywhere from 8 to 15 times greater than would be expected, have, for instance, been confirmed in the vicinity of the nuclear reprocessing plants at Sellafield, Dounreay and Cap de la Hague in northern France.

In Burnham-on-Sea in Somerset, near the Hinkley Point nuclear power station, the risk of cervical and kidney cancer is around six times the national average, leukaemia rates are four times and breast cancer twice the national average.

In Maldon along the Blackwater estuary in Essex, discharges from the Bradwell nuclear power station mean that women have a 30 per cent higher risk of contracting breast cancer and twice the risk of dying from the disease compared to those not living near a nuclear facility.

Blowin' in the wind

According to Dr Chris Busby, a Fellow of the University of Liverpool in the Faculty of Medicine, and co-founder of the environmental consultancy group Green Audit, 'The link between Sellafield and excess childhood cancer is now indisputable,' and the process through which people become contaminated is linked to the unique environmental conditions of the area.

Radioactive discharges into the air and

the sea from the plant are contaminating the Irish Sea with radioactive uranium, plutonium, americium, caesium and Strontium and this material is then blown back to the land by sea spray.

'Once there', says Richard Bramhall, Secretary of the Low Level Radiation Campaign (LLRC), 'there's an ecological sorting mechanism. The radioactivity adheres to the finest particles of sediment and that sediment eventually settles out where tidal energy is the least. When the water comes to a standstill, the particles fall out and drop down to the bottom and the water gradually recedes.'

This process is ongoing in estuaries and mud flats and around the coast where the particles are either churned up into the air by the tides or become airborne on the back of dust as mudflats and estuaries dry out. As this happens, the particles can easily get into lungs or onto crops and be ingested with food. Once inside the body, they release powerful bursts of radiation directly into body tissues.

Official denial

In spite of accumulating evidence that emissions from the area's nuclear facilities – Sellafield in particular, but also Oldbury and Hinkley Point – are to blame, government bodies, like the Committee on Medical Aspects of Radiation in the Environment (COMARE), set up at the time of the very first enquiry into the Sellafield child leukaemia cluster, and the Committee Examining Radiation Risk from Internal Emitters (CERRIE) reject the claim that nuclear radiation is the cause of these cancers. Instead they argue that:

- the doses of radiation received by the children are too small to cause harm;
- that humans have been exposed to natural radiation for years with no discernible harmful effects;
- that the excess cancer rates are probably best explained by a hypothesis known as 'population mixing'.

Not much radiation

The fundamental differences between dissenters such as Busby and Bramhall and the pro-nuclear establishment centre largely around the science of low level exposures, as well as important differences between the harm caused by external and internal exposure to radiation.

As with any poison, the route of exposure is as crucial as the dose. And the problem, says Bramhall, is that official tables and calculations used by government committees to assess the risk of inhaling radioactive particles are based on data derived from survivors of the Hiroshima bomb, who received massive external blasts of radiation.

Bramhall describes the difference this way, 'You can get a certain amount of warmth into your body by standing in the sunshine for half an hour. You could quite conceivably get the same amount of warmth into your body by eating a hot burning coal plucked from the fire. Obviously the results of one are beneficial and the results of another are fatal. But as far as the current radiation risk model is concerned, both are understood in the same way.'

Locked onto a single cell, hot particles are powerful enough to cause the kind of genetic mutations that lead to cancer

Of the three types of radiation that can be released from a nuclear facility – alpha, beta and gamma – it is alpha-emitting particles, or 'hot particles', that make up the majority of emissions from power stations, reprocessing and refuelling facilities. These appear to do the least damage externally because, while they contain a great deal of energy, they do not penetrate the skin deeply.

Once inside the body, however, they do not need to penetrate deeply to cause damage. Locked onto a single cell, they are powerful enough to cause the kind of genetic mutations that lead to cancer. Studies show, for instance, that hot particles such as plutonium-239, widely heralded as the nuclear fuel of the future, may be 10 to 1000 times more effective in producing cancer with an internal exposure than with an external one.

The internal effect is important since every cancer starts in a single cell and the damage from chronic exposure to internal radiation, according to Chris Busby's theory, occurs because the decay of some radioactive particles – which releases regular pulses of radiation to the surrounding body tissues – delivers a lethal one-two punch to cellular DNA.

Our cells have the amazing ability to repair mutations, and when a sub-lethal dose of radiation (or any pollutant) causes damage, it triggers an irreversible 8-hour repair sequence. During this process the cell is vulnerable and unable to affect a second repair to any additional damage it receives. In an individual who is inhaling or ingesting radioactive particles daily, the likelihood of a cell sustaining two damaging 'hits' of radiation within an 8 hour period is high, increasing the probability of pre-cancerous mutations that never get repaired.

In October 2004 CERRIE's first report into the risks of exposure to radioactive pollution, acknowledged that regulators needed to be cautious in assessing the risks of different types of exposures and that there remained a number of uncertainties in our understanding of the harm caused by internal radiation exposure, particularly in children. Because of these uncertainties, it continued, the likely risks associated with long-term internal exposure to low-level radiation could be underestimated by a factor of 10. The report also recommended that policy makers and regulators consider adopting the Precautionary Principle when dealing with these uncertainties.

'Man made' radiation

Many of the radionuclides emitted from modern nuclear facilities are 'man-made' and did not exist on earth prior to 1945. Once again, not taking this into account means that current models, based on exposures to naturally-occurring radioactive particles, can be poor predictors of risk.

These man-made particles are often compounded with natural elements, such as potassium and iodine, and so have a chemical affinity that draws them like magnets to certain organs and tissues of the body. This affinity is why radioactive particles are used so widely in targeted chemotherapy. In the body these radioactive elements

become interchangeable with biologically important elements and irradiate body tissues in novel ways that make them a potentially serious mutagenic hazard, the magnitude of which cannot be understood by looking at studies of external acute exposures like those received by Hiroshima victims.

The Chernobyl accident, say Richard Bramhall, is a good example of such interactions. 'Take the thyroid, which is a very iodine hungry organ. With radioactive iodine the body doesn't know it's a potential problem; it can't say to itself 'this is radioactive iodine, I don't want this.' All it knows is that it's iodine and it gets stuffed into the thyroid. The reason why there have been so many thyroid cancer and other thyroid malfunction problems following Chernobyl is because immense quantities of iodine-131 and its precursor tellerium-132 were emitted in the early hours of that accident.'

The high rates of childhood leukaemia around the Irish Sea coast can be understood in a similar way. Plutonium and uranium, for instance, have a high affinity for bones, and strontium latches onto chromosomes.

It must be 'population mixing'

Official bodies like COMARE explain the excess cancers around Sellafield as a result of 'population mixing'.

'The hypothesis', says Bramhall, 'is that when you have construction projects or industry flowing into remote areas, which Sellafield is, the construction workers bring with them a rare virus that the local population has no immunity to, and that childhood leukaemia is a rare response to this virus.'

To microbe-phobics it may sound plausible. However, the theory, first postulated in the late 1980s in response to the Sellafield clusters, has little credibility, since the virus has never been named or identified, or demonstrated to actually cause childhood leukaemia.

When compared to the mystery virus theory, the views of Busby and Bramhall on how low level radiation spreads through communities and how it gets into and damages the body, seem both plausible and rational.

They also shine a light on serious potential weaknesses in the way we determine and define the risks of radioactive pollution.

In addition to potentially underestimating cancer rates, official bodies like the International Commission on Radiological Protection (ICRP) also largely ignore the non-cancer effects from radiation that have been observed in people exposed to x-rays, in Hiroshima survivors and in populations exposed to nuclear accidents such as Chernobyl. These include higher infant mortality, more birth defects, miscarriages and stillbirths, more heart disease, cognitive abnormalities in children irradiated in utero, and chronic fatigue syndrome.

The ICRP also fails to consider the synergistic reactions that radionuclides may have with other substances, such as chemicals that may already be weakening cells' repair mechanism, or with damaging aspects of lifestyle such as smoking. And yet this 'big picture' understanding would seem necessary to fully appreciate how risky it might be to have a nuclear facility as your neighbour.

CANCER CLUSTERS, WHAT CANCER CLUSTERS?

Sellafield has released very large amounts of radioactive pollution into the environment since it began operations in 1952. The density of radioactive waste in the Irish Sea is now greater than that from atmospheric weapons testing and the highest concentrations are near the outfall pipeline, near the village of Seascale where, in 1983, Yorkshire TV found an excess of child leukaemia and lymphoma cases. Since then rates of childhood cancer have been increasing along the north Wales coast.

Investigations by the COMARE, CERRIE, the National Radiological Protection Board (NRPB) and the Wales Cancer Intelligence and Surveillance Unit (WCISU) have concluded that while the cancers are real they are not 'clusters' but natural variations in cancer rates.

The issue has refused to die, however. Local councils and residents, Dr Chris Busby and campaigners at the Low Level Radiation Campaign (LLRC) have continued to analyse data from the area. Their findings have spawned more investigative television programmes – such as the BBC Wales documentary *Sea of Troubles*, televised in February 1998 and the HTV documentary *Cancer in Children*, transmitted in February 2004.

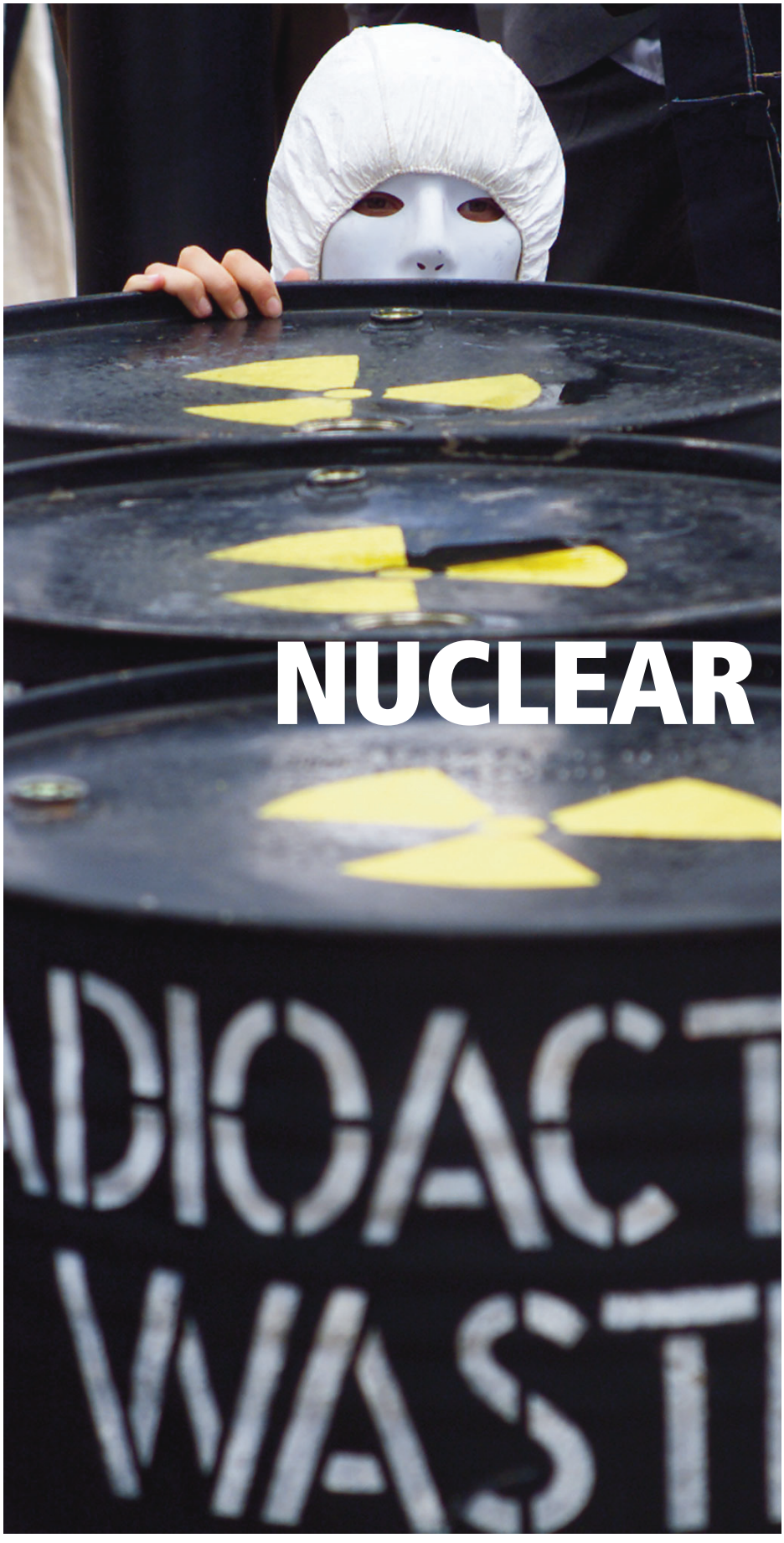
By 2005 there was a greater and more statistically significant excess of child leukaemia – 20-fold in Caernarfon and 5-fold or so in the 34 local wards within 10km of the sea. There was also an 18-fold excess of rare brain tumours in children in Caernarfon.

These cancers need rigorous and independent investigation. In 2003 the Welsh Assembly Government put out a tender for a study to measure the radiation in the Menai Strait, and the likely quantity inhaled by residents, to see if children were at risk. The tender was won by Westlakes Research Institute, a subsidiary of British Nuclear Fuels. In April 2006 after a study costing over £93,000 of taxpayers' money, Westlakes reported that, according to their mathematical risk models, the doses of radiation were too low to be the cause of the Menai child leukaemias.

This unacceptable state of affairs has now culminated in a Parliamentary Early Day Motion (No 1464) calling COMARE to be disbanded and for a radical overhaul in the way radiation risk is assessed.

The final resolution of this debate has far reaching implications for the government's decisions about nuclear power. This is why there have been such frantic attempts to deny or ignore evidence, and attack those who are showing that radiation from Sellafield is continuing to kill children in 2006.

■ Write to your MP asking him or her to sign Early Day Motion 1464. Contact the Low Level Radiation Campaign for further details. **www.llrc.org** Email **info@llrc.org**



5000 years ago the English Channel didn't exist – so where are we going to bury our nuclear waste that will be safe for up to one million years...or more?

NUCLEAR WASTE

When spent fuel is removed from the reactor core, it is a pulsating mass of radioactivity, containing uranium, plutonium, cesium, strontium, technetium and neptunium among other elements. If unshielded, it would kill a person standing three feet away in seconds. Even after decades of radioactive decay, a few minutes' unshielded exposure could deliver a lethal dose.

While the spent fuel only accounts for around three per cent of the volume of all waste from a nuclear facility, it holds 95 per cent of the radioactivity and is deemed to be high-level waste. Certain of its radioactive elements, such as plutonium, will remain hazardous to humans and other living beings for hundreds of thousands of years. Each 1000-megawatt nuclear power reactor produces about 30 metric tonnes of such high-level waste a year.

After being removed from the reactor, the spent fuel rods are stored in pools at the nuclear facility to cool down. The spent fuel rods remain hot because fission energy continues to be released as the radioactivity decays, so the pools contain boric acid to slow the process

down. It should spend between 6-18 months cooling before being removed to a permanent disposal site. As yet none has been permanently disposed of, as no one knows how best to safely store such dangerous material, or where. A consequence of this is that many nuclear facilities have had to enlarge their storage pools to accommodate all the high level waste produced since they started generating electricity.

As fuel pools were not designed for more than temporary storage, there are many hazards associated with them. According to the Nuclear Information Resource Service, these include the potential for loss of coolant, which could result in spontaneous combustion of the fuel, or in some circumstances, nuclear meltdown of the pool.

Another distinct possibility is that facility managers lose track of how much waste they have and it simply goes missing. In 2002, a decade after the Dominion reactor in Connecticut, was decommissioned; the US Nuclear Regulatory Commission was informed that two spent fuel rods were missing. A subsequent inquiry concluded that the fuel had most likely been cut into segments and sent to a low-level radioactive waste dump, which would afford inadequate protection against high-level waste. The operator was fined around $300,000.

If the spent fuel is reprocessed to rescue the plutonium, then stockpiles of plutonium build up. Again, the security risk is all too apparent. In 2003-4 British Nuclear Group admitted that the reprocessing facility's fuel inventory didn't add up and that 30 kilograms of plutonium could not be traced. 'Some years there is an apparent gain, some years there is an apparent loss,' a BNG spokeswoman said at the time of the inventory, which has been kept since 1970.

Guidelines issued by the International Atomic Energy Agency (IAEA) say that material unaccounted for must not exceed three per cent of the amount that is processed. 30 kilograms would represent around 0.1 per cent of that amount at Sellafield. That means around 900 kg of plutonium could go missing before the world's nuclear regulator became alarmed. Yet it takes only around 10kg of plutonium to make a bomb. According to the Oxford Research Group, a 'dirty bomb' of such magnitude would devastate a city centre.

The Committee of Radioactive Waste Management (CoRWM) has recently said that these stockpiles of waste should be stored underground. In the process, it ruled out such options as putting it on the ocean floor or flying it into the sun. CoRWM is well aware that any chosen site will meet a high level of public opposition. In America in 1987, Yucca mountain in Nevada was designated as the final repository for the 700,000 tonnes of nuclear waste accumulated from their civil nuclear power programme. It has been the subject of a legal wrangle ever since. Recently, the US Environment Protection Agency was defeated in court for 'arbitrarily' guaranteeing the waste would be safe for 10,000 years. The US National Academy of Sciences told the court the figure should be 300,000 years. In Sweden, by comparison, a guarantee of one million years is demanded.

Once a site has been identified, the waste must be delivered by road or rail – another hazardous journey. In a study for Greenpeace, nuclear expert John Large, of Large & Associates, concluded a terrorist attack on a routine transport of nuclear waste in the UK could spread radiation over 100 kilometres. As the train routes pass through several large towns and cities, such as London, Bristol and Edinburgh, tens of thousands of people could be exposed to radiation.

Yet local authorities along the nuclear road and rail routes are not required to have in place any emergency plans, or a strategy of how to inform the public of what best to do in the event of accident or attack.

Each 1000-megawatt nuclear power reactor produces about 30 metric tonnes of high-level waste a year

Once at the chosen site, the fuel will be buried some 500 metres below ground in specially – prepared flasks that can withstand corrosion. Considering how long the waste will remain radioactive, an element of wishful thinking needs to take place to believe this can be successfully achieved. Five thousand years ago the English Channel didn't exist. 10,000 years ago a volcano erupted near Yucca mountain. Geology changes in ways that can't be predicted. The climate is changing; sea levels are set to rise. To think this is a problem we can leave to future generations to resolve is not only morally repugnant, but presupposes they will be in a position to do so. A fuel crisis is looming now. It is a distinct possibility that future generations could find themselves with mountains of radioactive waste to dispose of and little energy with which to achieve the job. Any renaissance in the nuclear industry will simply compound the problem we face now.

Another area yet to be decided on is whether the repository should be sealed or left accessible for future generations to monitor. There is an inherent security risk associated with doing this. Who is going to guard the repository and its contents? It is all too evident what happens when a country becomes politically and economically unstable from what is known about Russia, where plutonium routinely goes missing.

In 1997, former Russian National Security Adviser General Alexander Lebed stated on American television that the Russian military had lost track of more than 100 suitcase-sized nuclear bombs, any one of which could kill up to 100,000 people. With resource wars over oil, gas and uranium a distinct possibility, no nation in the global economy can guarantee economic stability, at which point the stockpiles of nuclear waste would become vulnerable to theft.

Despite all this uncertainty, a price has been put on the cost of disposing of the waste in the UK. This has risen from an original figure of £52 billion to around £70 billion in the past few years. In America consumers have been charged one cent per kilowatt-hour of electricity used to pay for the eventual disposal of nuclear power waste. This has raised in the region of $18 billion, of which $6 billion has already been spent investigating the suitability of Yucca mountain as a final repository.

DECOMMISSIONING...

...has a ring of finality to it. But don't be fooled. A nuclear reactor will be standing for another 150 years before it is finally razed to the ground

As with permanently disposing of radioactive waste, the UK nuclear industry has never fully disposed of a commercial nuclear reactor. The major problem is that the reactor contains highly radioactive high-level waste that is less easily managed than spent fuel.

It takes three years alone to remove the 60,000 fuel rods that were in the reactor core when it powered its last watt. The sheer volume of the job causes delays, as this 'high-level' waste has to cool for at least six months before it can enter interim storage, before being prepared for final disposal.

Simultaneously, work gets underway on removing other high-level waste, known as CRUD – corrosions, residuals and unidentified deposits, or 'primary hazardous materials' – from the cooling systems. Again, this is high-level waste that has to be casked and sent for permanent disposal.

Decontamination of the facility follows, where residual radioactive and chemical waste is removed from the fabric of the buildings and equipment by washing, heating, chemical or electrochemical action, and mechanical cleaning. This creates a cocktail of chemical and radioactive particles that will evaporate into the atmosphere or leak out into the ground. Some auxiliary buildings on the 'non-radioactive' side of the site will be removed or recycled 'for possible re-use', and the reactor's biological shielding may be dismantled.

The reactor itself is sealed. This is known as the 'care and maintenance' phase and can last up to 100 years depending on the policy of the installation state. During this time the site is policed and monitored.

Entombment 'safely' encases the reactor core in concrete... but 20 years on Chernobyl's concrete overcoat is cracking and radiation is leaking out

If it can be demonstrated that radiation levels are below the national regulatory requirements, the operating licence is terminated and parts of the site outside the reactor can be made available for 'appropriate' re-use. In the UK it will be designated a 'brownfield' site, perhaps suitable for 'appropriate' industrial purposes.

After this time, demolition and site clearance takes place. The reactor core is unsealed and starts to be taken apart. At this point it still contains dangerous radioactive waste. The core reactor contains parts that are known as 'activation products', such as steel components that have been exposed to neutron irradiation during the reactor's generation life. The atoms of these components are changed into different isotopes, such as iron-55, cobalt-60, nickel-63 and carbon-14. The first two emit gamma rays, but with a short half-life, so that after 50 years from closedown their hazard is much diminished, but not to a level where it is safe. It is classified as intermediate waste, which means the core reactor has to be dismantled and cut into small pieces to be packed in containers for final disposal.

Finally the containment buildings are demolished. The rubble could either be removed or buried on site: both options are being considered. Only now can the site be termed decommissioned and the land made available for 'alternative use'. Monitoring of the site ceases at this time.

While this process has never been fully achieved, the UK Atomic Energy Authority (AEA) is presently directing the decommissioning of the experimental Windscale Advanced Gas-Cooled Reactor (WAGR) at Sellafield. This reactor opened in 1963 and operated until 1981, when decommissioning started. While the land at the facility is due to be returned to brownfield status by 2030, it could be another century before the core is opened up and prepared for long-term disposal. It is estimated decommissioning WAGR will cost between £80-100m. This is being paid for by the Department of Trade and Industry, which sees it as a 'demonstration project' for marketing expertise and skills to other nuclear countries.

In America, industry and government estimates for the cost of decommissioning have risen from an initial $120m in 1991 to a staggering $450m.

Such overruns have led the industry to consider another option: entombment – a 'does what it says on the tin' cost-cutting measure. Rather than expend time and energy on the 'care and maintenance' phase, entombment requires the reactor core to be encased in concrete. This is how Chernobyl was contained, but 20 years on its concrete overcoat is cracking and radiation is leaking out – a fitting reminder of the folly of nuclear power.

A NUCLEAR FUTURE?

The Iraq war, the single farm payment, and finally a very expensive Nuclear new build. Can it get any worse asks Rachel Francis?

As Tony Blair embraces a nuclear new build and pushes aside recent failures to meet reductions in greenhouse gas emissions across the UK, I took a train ride from Devon to Woking to find out if there is a better solution.

I talked to a geology student on the train going to Exeter. She described in detail how the earth has changed over the past million years; how Scotland used to be a volcanic area; how the seas and oceans have shifted and changed, like immense amorphous organisms, over the course of time; how movements in the earth's crust have created great mountainous areas and deep ravines; how fault lines break open; how the earth plates collide …

In the UK most of our electricity still comes from huge coal and gas power stations. Drax power station in Yorkshire (alone) emitted 20.8 million tonnes of CO_2 in 2005. The remaining huge power stations like Drax are the monuments to the UK's centralised energy system… a system which revolutionised the way people lived in the 1920s and 30s, by providing an electricity supply for all homes and businesses. But almost a century later, faced with a global energy crisis and climate change, these power stations begin to feel like dinosaurs… They are heavily polluting, releasing massive amounts of gases, particulates and heat into the atmosphere and they are hugely inefficient, wasting roughly 65 per cent of primary energy input through heat release, long distance transmission, and inefficient end use.

Enter the nuclear solution. Nuclear power stations run with the 1920s idea of a centralised energy system but compare favourably to coal and also gas power stations in terms of reducing CO_2 emissions at the point of production.

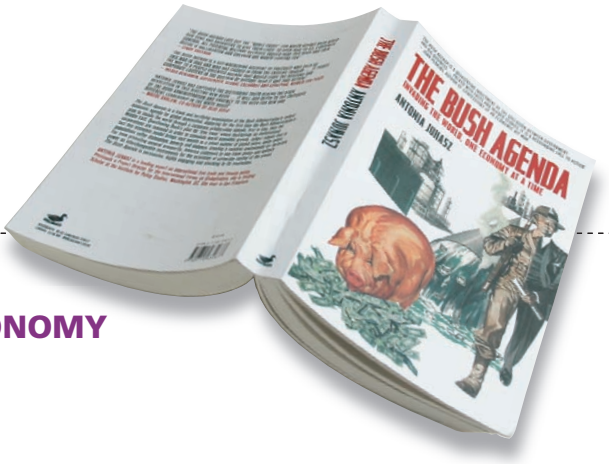
But in Woking and parts of Scandinavia "out of the box" thinking is leading to an energy revolution that could replace the nuclear option altogether.

The thing about Woking is, they haven't compared the giant wind turbine to the nuclear power station in terms of electricity output… because that's not the point. The point is to decentralise the energy system using local resources and to distribute that through a local network. For example modern combined heat and power (CHP) units produce electricity from gas or biomass, and the heat produced is used to heat local amenities and housing. This improves the overall efficiency of gas threefold… i.e. reducing gas consumption and CO_2 emissions by 65 per cent. Since 1990 Woking borough council has slashed energy use by nearly half, and council CO_2 emissions by 77 per cent. They have turned existing buildings into energy generators through the use of solar photovoltaic roofs and other renewables, and are exploring means of creating environmentally friendly energy from waste. Alongside the development of a clean, secure and efficient power supply, has been a complementary initiative actively promoting efficiency in the home through things like insulation and energy efficient appliances.

From a local perspective the initiative has created income generation, jobs and security. If the national grid fails, then Woking can switch to "island generation mode" and continue to access energy from the private network. From a national perspective Woking council has slashed energy use and CO_2 emissions by 6-times more than the requirements laid down in Kyoto for UK reductions 2010.

I return to my home in Devon: the rolling hills, the new crop of lambs, the quaint villages and the dark tors of Dartmoor rising as backdrop. Across the country suitable places have been identified as possible sites for the dumping of nuclear waste. There are seven potential sites in Devon. The nearest one to me is only 10 miles down the road at Willsworthy ranges. I hope that the nuclear waste dumps will not be in my backyard, here in Devon. But all across the country other people share similar hopes for their own backyards. We are all (well mostly) NIMBYs at heart, and I believe that this indicates how much we care. But although we have to protect our own back yard, we should see ourselves within the greater picture.

BOOK EXTRACT



THE BUSH AGENDA:
INVADING THE WORLD, ONE ECONOMY AT A TIME

Antonia Juhasz
Duckworth 2006, £10.99

On September 10 2003, the opening day of the fifth ministerial meeting of the World Trade Organisation (WTO) in Cancun, Mexico, the sun was shining, the temperature was hot, and the sky was clear and blue. Ten thousand people, mostly farmers and campesiños from across Mexico and Central America, joined by several hundred gringos from the North and others from around the world, gathered to march in protest of the WTO.

The march wound through the streets of central Cancun, where those who service the hotel industry live, until it approached Kilometer Zero, the beginning of the hotel zone. 'The Zone' is where tourists on spring breaks drink frothy piña coladas and dance topless on the bar at Señor Frogs. It is also where government trade ministers come together for WTO ministerial meetings. The pace slowed and the mood began to darken as the marchers reached Kilometer Zero.

Waiting to meet them were heavily armed Mexican riot police, cement barricades, and a 10-foot high metal fence. The cold stares of the military-clad police reflected their determination to keep the marchers away from the tourists and the trade ministers.

The standoff that ensued took place directly beneath a coloured billboard with a man's broadly smiling face and a caption that read 'Bienvenidos a Cancun!'

Many of the marchers held back, trying to keep a safe distance between themselves and police. Yet the 60 or so farmers, teachers, and trade unionists who had travelled all the way from South Korea were not deterred. Decked out in matching hats, T-shirts, and vests imprinted with anti-WTO slogans and carrying a giant colourful handmade paper dragon, they were impossible to miss.

Their average age looked to be about 50; most had closely cropped hair and wore conservative clothing beneath their anti-WTO apparel.

They were the first group to approach the fence shouting 'No No WTO!' Hundreds of the marchers soon followed. When two men from their group climbed up on top of the fence and raised their fists, the crowd cheered and took up the chant.

WTO kills farmers

None of us knew at that moment what we were witnessing. We looked on, still cheering, as one of the South Korean men, wearing a sign across his chest that read 'The WTO Kills Farmers', removed a Swiss army knife from his pocket, deftly stabbed it into his chest, crumpled into a ball and fell from the top of the fence to the ground. I shouted 'Los Medicos!' but to no avail.

Lee Kyung had dealt himself a lethal wound that punctured his lung and heart. He died at the local hospital a few hours later while hundreds of people mourned outside. His suicide took place on *Chusok*, the Korean Day of the Dead. It was an act of protest of WTO agricultural policies that had bankrupted his farm, impoverished his family, and devoured his community. He left a note that read: 'It is better that a single person sacrifices [his] life for 10 people, than 10 people are sacrificed for just one.'

A farmer from Taesong-Ri, a small rural village in South Korea, Lee owned and worked an 80-acre farm with his wife and three daughters. They raised cows and grew rice, corn, and other vegetables. Lee's ability to make a living off his farm fell virtually in proportion to the steady increase in his government's implementation

South Korean Lee Kyung (left) before his suicide on the opening day of the ministerial meeting of the WTO in Cancun, Mexico

PHOTOGRAPH BY **REUTERS**

of the WTO's Agriculture Agreement. In 1999, his farm was foreclosed. Lee was not alone. As farmer after farmer were forced from the land, the population of Taesong-Ri dropped dramatically from 1,500 in the mid-1980s to just a few hundred in 2003.

WTO rules permit nations to subsidise agricultural producers and exporters, while denying governments the ability to provide price supports, market protections, or subsidised inputs – such as fertiliser, seeds or tools – to their farmers. The all too common result is that all over the world small farmers are undercut by cheaper, subsidised products and then pushed off their land into poverty.

Meanwhile, control of the world's food supply remains concentrated in the hands of those who are able to export their crops on the world market, those being an ever-shrinking number of giant, multinational agriculture corporations.

If farmers like Lee go to their local and national governments to complain, they are told the WTO sets the rules and the government must comply. Not only is the WTO's destructive impact on small farmers and communities tragically widespread, but so too is the desperate response, commonly referred to as an "epidemic of suicide among small farmers".

In India between the years of 1997 and 2003, over 20,000 farmers committed suicide in response to identical policies.

In just one instance, a staggering 1,600 farmers in the Andhra Pradesh district killed themselves by drinking their own pesticides.

Standing up for their own

Four days after Lee's suicide, on September 14 2003, the fifth ministerial meeting of the WTO collapsed in failure.

While Lee's act brought the plight of millions of farmers to global attention, it was already well known to their governments. Thus, developing country delegates were prepared to refuse to sign any WTO ministerial agreement that did not provide significant protections for their countries from the Agricultural Agreement. Not only were such protections denied them, but the European Union and the United States refused to negotiate any deals without an agreement on investment protections for multinational corporations.

Two days earlier, a letter had been submitted to the chair of the WTO negotiations by 70 developing countries, demanding that the foreign investment agreement be withdrawn altogether because of the damage it would do to their small businesses, local producers, and domestic economic development policies. The demand was rejected.

Ronald Sanders, the trade minister for Antigua and Barbuda in the Caribbean, told a reporter: 'My government has a duty to care for its people. Were we to accept this document [the September 13 2003 WTO draft ministerial text] we would deserve our people's condemnation. For we would not only have gained no relief for them, we would have condemned them to a life of perpetual underdevelopment. And that does not enjoy the

RECOMMENDED BOOKS

support of my government.'

The day after Lee's suicide, I stood on a rain-soaked patch of grass on Kilometer Zero. The shock still weighed heavily on me as I stared at a makeshift memorial that had emerged over the course of the previous night and morning. There were white candles, flowers, and handwritten signs in both Korean and English.

It had been six months since President Bush launched a pre-emptive war against Iraq and four months since he had declared: "Mission Accomplished". The occupation of Iraq had begun – and so, too, the reconstruction. Not the reconstruction of vital public services such as water, electricity, or public security, but the far more radical reconstruction of Iraq's entire economy.

Apparently, what United States' trade representatives failed to achieve through international negotiation, the US Administrator of the Coalition Provisional Authority succeeded in achieving through military invasion.

Standing in the rain in Cancun, all I could think was, *God, this is just the beginning.*

Car Sick

Lynn Sloman
Green Books 2006, £10.95

The financial flogging of the motorist and the approval of yet more roads is probably not the answer to the UK's traffic crisis. Lynn Sloman's proposal to reduce the number of cars in Britain is a passionate attempt to de-motorise the people of Britain.This fascinating book looks into the discarded communities, environmental destruction and personal dissatisfaction caused by today's 'car-addicted culture'.
With a refreshing change of perspective, *Car Sick* will compel many car owners to question why they continue to force pedestrians into the ditch.
Reviewed by Tom Ireland

Recycle: The Essential Guide

Black Dog Publishing 2006, £19.95

A rousing introduction by Lucy Siegle puts a philosophical spin on recycling, likening it to modern day alchemy and questioning why humans are unique in terms of resource and energy use. The real treat within this guide, however, is the completeness of its recycling advice – look up the material you are about to carelessly dump, from your household cardboard to your car, and a wealth of advice will ensure it enters the recycling process efficiently. That's if you haven't already found an alternative use for it.
Well presented and fun to read, *Recycle* includes 16 case studies of successful recycling schemes from around the world to inspire and encourage.
Reviewed by Alison Limpard

21st Century Smallholder

Paul Waddington
Eden Project Books 2006, £12.99

Delivering the principles of sustainability into the city dweller's home, this book shows you how to avoid industrial agriculture even if you haven't yet got your own fully functioning farm. Not promising self-sufficiency, Paul Waddington provides a handbook packed full of green advice from growing herbs on a windowsill to larger projects like re-directing sink and bath water to flush the toilet. Aesthetically pleasant guides to growing and raising your own food accompany serious food for thought on how you can, and why you should make a difference.
Reviewed by Tom Ireland

Field notes from a catastrophe

Elizabeth Kolbert
Bloomsbury 2006, £14.99

Reporting from the front line of the climate change crisis, Kolbert travels around the globe to the habitats already feeling the pressure of global warming. While others may warn of impending doom in future years, this book provides a detailed and very readable account of the problems many communities are faced with as the puddles form in the Arctic. Writing with clarity and wit, Kolbert goes on to explore the relationship between science and politics and how we continue to cover our eyes to the visible changes happening around us.
Reviewed by Tom Ireland

The Challenge of Affluence

Avner Offer
Oxford 2006, £30

A challenging social critique that questions the effect of consumer choice on both individual and social well-being. Offer investigates the social and psychological costs of inequality and status as we are guided through the age of material abundance.
Combining areas of economics, psychology, sociology and politics, *The Challenge of Affluence* links the arrival of affluence in the US and Britain in the 1940s with a wide range of social and personal disorders.
Reviewed by Sarah Barclay

green pages

LA CANNETA
Organic dry white wine from the Tuscan hills

Free-Range Fashion at Hackney City Farm

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MEET TOM BEASTON
Ghost Town Britain Buster

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[1] Based on BWEA and ASA figures of an emissions factor of 860g CO2/kWh for electricity generated by coal fired power stations, typically displaced by wind power generating capacity.

Contents

green pages green pages

79 GREEN SHOPPING GUIDE...

...making every £1 count

If we want to stop the destruction of this planet, and create local, vibrant communites we are going to have to stop shopping in supermarkets and multinational chain stores and make every £1 we spend count by shopping in local, independent and ethical producers and retailers.

PLUS! ECOLOGIST READER OFFERS

FOOD HERO: *Tom Beaston*

Farm W5, Tom Beaston's small west London shop is a life line for over 50 small-scale growers and producers. **Mike Stones** on his heroic fight to keep it local and real.

It looks like so many suburban food shops: tiny frontage, long interior, three doors down from the hairdresser, Big Jim's Trims. The first impression of Farm West 5 in Ealing, west London was not memorable.

Half an hour's conversation with proprietor Tom Beaston changed my view. This is a war zone. The shop's calm, cool, high-ceiling interior doesn't feel like a battleground, but it represents one miniscule counter-offensive against the onslaught of retailing giants.

In this combat zone it's not difficult to witness the casualties. They litter the high streets of towns and villages throughout the country. Boarded up or swallowed by the big retail chains, small independent shops are under threat as never before. More than 7,000 family or individually owned shops disappeared between 2001 and 2005; a 21 per cent slump according to the independent *High Street Britain 2015* report.

Beaston is a Food Hero unlike any other in this series. His qualification is the passionate pursuit of an idea: to offer customers the choice of handcrafted and ethically produced food supplied, where possible, from local producers – some from within his own postcode.

Medium height, blue jeans, brown sweat shirt, brown jacket topped by pale blue eyes and a receding hairline, Beaston, age 40, is not a man to command attention until he speaks – particularly about food. It's a transformation that animates his whole body: his shoulders, face and hands all become props to press home the force of his argument.

Passionate about porridge

'These are the best porridge oats on the planet and we are the only retailer in London selling them.' He picks up a packet of Pim Hill oats, spins them around the fingers of one hand and sets them back on the display rack.

It takes serious conviction to be this passionate about porridge. He knows who grew the oats, where and how. Beaston bristles with enthusiasm for food and drink, particularly when it stocks the shelves of Farm W5. 'I've got more to say about my food than the manager of a 20,000ft supermarket,' asserts Beaston.

The star attraction is local honey. 'All good local food shops should sell honey

PHOTOGRAPHS BY **CHARLIE GRAY**

from their own postcode – it should be the test of a shop's quality.' His honey is supplied by John Wilson, who keeps his hives within a short cycling distance of the shop. 'What makes this honey special is that it is so natural – it is produced without heat treatment or added sugar, and it's so local.'

Local provenance is an expression that recurrs frequently. It's not just a tactic for combating the retail power of the armies of supermarket stores. For Beaston, it's a personal commitment. 'Corporations account for about 95 per cent of most people's spending. If everyone spent more with local businesses, we'd all be richer.' It's a mission Beaston feels compelled to undertake, not just for food but also the furniture in his store and even the artwork on its walls.

Backing other locals

Nestling at the back of his shop, there's a tiny café offering fair trade coffee and juices, as well as fresh salads, sandwiches and cakes. Picking up a chair Beaston remarks: 'I could have ordered this from Ikea, but buying from a local clearance firm returns 100 per cent of my money to the local community. Think what a difference if all shops bought local recycled furniture.'

The five or six watercolours and acrylics also come from local artists such as Jonny Glover. When a work is sold, artists are not charged a commission but asked to make a donation to the finances of the shop. For him it is a point of principle.

For Beaston there is no line between creating art, producing food and selling it. 'To be good at producing food you have to be an artist. And if you're selling food and not an artist, you might as well be Lord Sainsbury.'

I ask him to explain: 'The likes of Sainsbury's are as happy to sell CDs as food, or be your banker, or promote GM food in parliament. They are only selling it to make money. But you need to be passionate to sell good food; you need to create things from it and you need to love it, because from my experience it's not for the money.'

The shop stocks 750 lines of food and drink and judging by our 30 minute conversation, Beaston promises to be equally enthusiastic about all of them. He selects stock according to its taste and ethical provenance. Certainly the moist, delicious chocolate brownies I was offered could not be beaten.

But you won't find Rachel's Organic's produce. 'Rachel's is owned by a large American company which has helped to suppress the UK organic milk price.' Neither will he stock Ecover washing products because they are owned by the security company Group 4.

Hand picked suppliers

Suppliers are sourced by personal recommendation, visits to farmers' markets and directories like Green Pages. The shop supports more than 50 small-scale growers and producers from Cornwall to Scotland.

'Anyone selling wild mushrooms should be shot. Virtual slave labour is used to raid places like the New Forest – natural populations should be allowed to recover.' Farm W5 only sells organic farm-grown mushrooms, mostly chestnuts and portabellos, from Jane Dick at Fundamentally Fungus in Stockbridge, near Winchester, Hants.

I sense the need to separate the man from his food or at least his shop. There are just too many distractions – food products to eulogise as well as customers to be courted.

He suggests we continue over a drink, but where? The franchised Irish pub, or the independent wine bar four doors down whose proprietor helps him buy organic wine? Silly question.

Over glasses of house red and a packet of 10 Embassy cigarettes, Beaston confides it's been a bad day. 'I'm not a smoker, but two friends' independent food businesses are facing closure.'

Two more potential casualties in the battle to offer shoppers choice and to secure the future of small businesses. 'Every time a supermarket opens, up to 300 small shops close,' he comments.

Talk of closing prompts me to ask why he opened Farm W5 six years ago. 'I wanted to run a good local, real food shop.' Has he succeeded? 'If I ask someone else, I've over achieved. If I ask myself, with the exception of making lots of money, I have been successful. I've proved you can buy local, live local and be part of a community. And I've met fantastic people – farmers, bakers and jam makers as well as environmentalists.'

People like master baker Tony from East Dulwich, London who produces what Beaston regards as 'the best bread in London or Paris'. And Jason from Farmhouse Cookery in West Sussex, who supplies the shop and café with hand-baked cakes.

Suppliers have become friends, like Stefano and Pete who source food for the delicatessen, and Paul who buys biodynamic vegetables that never see the inside of an aircraft.

His shop has about 1,000 visits a week from people who want something more than supermarkets can offer and are

prepared to pay a little extra for it. 'People shop here because we offer real taste and information about where our food comes from and how it is produced.' The staff, Beaston prefers to call them farmworkers, care about the quality of the food they sell, and the people who produce it, and they want to share this with shoppers.

'Like cheese? Then taste this Appleby's Red Cheshire. My family has been eating this for 100 years and it dates back to Roman times.'

'We are bringing customers closer to the people who produce their food and in doing that we're bringing them closer to reality.'

Nothing but the best

'Farm West 5 is about supplying the best, the most interesting and the most ethical food available.' And that does not always mean organic. 'I'm a slow food, rather than an organic food, specialist. Organic food has become bastardised as a brand by the supermarkets. Sometimes organic food is so commercial, it's difficult to know where it comes from.' Food needs honesty.

'We are bringing customers closer to the people who produce their food and in doing that we're bringing them closer to reality.'

It's a food and business philosophy rooted in his Cheshire farming childhood of the 1960s and 1970s. Beaston grew up on the family's 75-acre dairy farm, sold long ago, near Nantwich.

Unfashionably in the early 21st century, he is a man proud to describe himself as a peasant. 'I still think of myself as a peasant. It's one of the most respectable professions.'

This is not the false humility of a dispossessed farmer struggling to acclimatise to city life. He really means it. For him it is a tribute to his parents, who grew the best of organic, garden fresh vegetables simply because it was their only option.

Beaston is a survivor. He knows the strength of the corporate battalions, backed by economies of scale, and their war of attrition against small independent retailers. His business – and those of his friends and suppliers – are right on the front line.

It's that quality of combat-readiness that makes him so insistent on local spending, whether on food, chairs, art or anything else.

'Spending money locally sets up a virtuous circle which benefits everyone locally – except big business. We should all focus our income on products produced and sold by local people. If we don't, there's no local community.'

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THIS MONTH'S VINEYARD:

LA CANNETA

Tucked away in the Tuscan hills, Stefan Grandi and his partner Valeria Bevilacqua have perfected the art of producing organic dry white wines. BY **MONTY WALDIN**

Stefano Grandi and his partner Valeria Bevilacqua's 'La Canneta' vineyard is both an oasis of green in the Tuscan town of San Gimignano and the source of some of San Gimignano's most clear-tasting and appetising dry white wines. These are made from the Vernaccia wine grape: hence 'Vernaccia di San Gimignano', which is Tuscany's most famous dry white wine. It has been made here since the thirteenth century.
La Canneta's vineyards are an oasis of green, in both the literal and metaphorical sense: green to look at because grass is allowed to grow between the vine rows, and green in principle because the vines, which cover eight hectares (20 acres), have been certified organic since 1989.

'San Gimignano is one of Tuscany's most visited tourist towns,' says Stefano, 'due to its dramatic skyline of medieval towers. Tourists call it "Tuscany's Manhattan". What you must remember is that most of the wine produced in San Gimignano is sold directly to tourists, and for generous prices. In San Gimignano we are lucky to have such a captive and ready market for our wines. It is tempting therefore to sit back, make money and not worry too much about doing the extra – either for wine quality or the environment.'

Predictably, there are only a handful of organic San Gimignano vineyards. In fact Stefano was the first San Gimignano wine grower to go organic. 'I did it for two reasons. Number one, I am relatively young to be a winegrower and as I grew up in the 1970s when there were big concerns about energy use, chemicals and the environment, I always felt predisposed to the environmental cause. Secondly, and most important, is organics makes better quality grapes, all other things being equal. I make wine not just because it helps pay the bills, but because I like drinking it, too.'

Stopping the rot

Stefano says there are two main problems he has to deal with if he wants to grow healthy organic grapes without recourse to man-made vineyard sprays.

'The first problem is rot, which is caused by the spores of the Botrytis cinerea fungus. This punctures the grape skins near harvest and vinegarises the grapes. Instead of man-made, chemically synthesised fungicides we use a type of clay in powdered form. After the vine has flowered in June, the grapes are formed. At this stage on the grape bunch the individual grapes are embryonic and small, so there is plenty of space between each one of them on the bunch. As the summer continues, the grapes build up moisture and sugar, and the grapes swell in size. Just before the grapes swell so much that they begin to touch each other, we spray them with this clay powder. What this does is to ensure that any stray rot spores are unable to reproduce and rot the inside of the bunch once the grapes touch. Fungal spores need moisture, so by spraying clay powder we make sure any moisture, from rain for example, is soaked up and dried in the clay which is absorbent, rather than being used by the rot. We get much healthier grapes this way, and cleaner tasting wines with more piercing flavours.'
The second main challenge says Stefano is a more general one, and concerns the health of the soil. 'Our soils are quite light, consisting of sandy deposits laid down from

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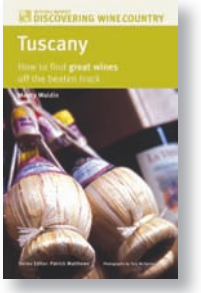

PHOTOGRAPH BY **TORY MCTERNAN**

Stefano Grandi, who speaks excellent English, says: 'Anybody is welcome to visit La Canneta. Visits are free and there is no obligation to buy wine. Just remember that the road to our winery is quite steep and narrow, making it impossible for coach parties; but you can come by car – or better still, on a bicycle!' In the summer you can walk to San Gimignano from La Canneta along the Imboltroni river. It will take two hours. You will need sturdy, wading-style boots. You can stop to swim in rock pools and remind yourself that while the tourist hordes are getting overheated in traffic jams trying to get into the medieval town, you can cool off in the river while enjoying some well-earned natural tranquility.

when this part of Tuscany was still under the sea. The terrain here is quite hilly, so it stands to reason that if you are growing grapes on friable soils on hill slopes, you have to pay attention to stop your soils eroding, either when it rains, or when it is hot, or when it is windy. In other words you have to pay attention all the time, as Tuscan weather is always hot, wet or windy. We make sure that rather than encouraging erosion by leaving bare soil exposed to the elements, we keep our vineyards grassed as much as possible. So we never use weedkillers which are the cheap way of removing unwanted grass and weeds in the short-term, while also polluting the water table and burning the soil so that it erodes more easily in the long-term. Instead, we prefer the slower and more expensive options of mowing the weeds in summer, while also occasionally ploughing weeds out from a narrow strip of soil directly under the vines in autumn to allow oxygen in. This helps the vine roots, whose main period of growth is in autumn and winter, grow deeper.'

Deep roots

'The vine roots are encouraged to remain deep by the fact that the vineyard is grassed over during the summer: from budburst in spring, to the moment the grapes ripen in autumn. What happens then is that the grass takes quite a bit of the nutrients in the topsoil, so in order to feed itself the vine roots must descend deeper into the subsoil. The grass competes with the vine roots, forcing them deeper. If you have deep rooting vines your vines will be stronger and inherently more resistant to disease, plus they will give you more interesting wines. This is because the grapes remain relatively small and concentrated in flavour, because the vine has to work really hard for its food by sending its roots so deep. We couldn't make our top wine called 'La Luna e le Torri' unless we had deep rooting vines producing concentrated grapes. This wine is barrel-fermented. If the grapes had only light, ephemeral flavours from shallow-rooted vines they would be drowned by the extra tastes of nuts and vanilla that barrel-fermentation gives. So, you see, organics can also give you more options as a winemaker, as well as being environmentally sound.'

Something to bear in mind on your next visit to San Gimignano.

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LA CANNETA TASTING NOTES

Canneta has been certified organic since 1989 by QC&I.

Vernaccia di San Gimignano 'La Canneta'
This dry white is made from 90 per cent Vernaccia and 10 per cent Riesling grapes. The Vernaccia has a fantastic, slightly oily texture and is quite full bodied, making this one of the rare Tuscan dry white wines capable of standing up to hearty main courses. Vernaccia also has a quite distinct flavour of almonds or liquorice, and a crispness that led Michelangelo Buonarotti the Younger to say in 1643 that Vernaccia 'kisses, licks, bites and stings'.
Stefano Grandi is a sensitive winemaker in that he accentuates Vernaccia's strengths – its body and unique flavours – without falling into the trap of making the wine too bitter. 'This can happen if you let the juice of the freshly picked grapes soak too long on the grape skins before separating the juice for fermentation. The skins can add a vegetal, harsh taste to the wine, which is not at all what I want, so we press our grapes as whole bunches – meaning the juice spends only a few seconds on the skins as they are broken by the pressure of the wine press.' The Riesling adds a subtle lime-peel flavour to the aftertaste.

Vernaccia di San Gimignano Riserva 'La Canneta – La Luna e le Torri'
This dry white is made from 90 per cent Vernaccia and 10 per cent Sauvignon Blanc grapes. 'The difference between this wine and the one above,' says Stefano, 'is that here we select the Vernaccia grapes from our best vines, and then ferment some of the juice in oak barrels. We use oak from the Allier forests of France, which gives a tight grain, stopping the wine tasting too woody. After fermentation, we leave the wine in the barrel to rest on the dead fermentation yeast. Its presence helps round out the fruit flavours of the wine grapes and the pine-nut flavours of the oak barrels. The dead yeast also makes the wine naturally more stable and less likely to oxidise, meaning we use only minimal amounts of the wine preservative sulphur dioxide [used in 99.9 per cent of all wines, organic or otherwise]. We think adding too much sulphur increases your chance of a headache!

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WINE CLUB CASE 3: SUMMER CHILLERS

June selections:

LA CANNETA

1) Vernacchia di San Gimignano (x2)
2) Vernaccia di San Gimignano 'La Luna e le Torri

July selections:

FASOLI GINO

3) Bianco di Custoza (x2)
4) Soave Pieve Vecchia
5) Bardolino Corte del Pozzo (x2)
6) Valpolicella Corte del Pozzo (x2)
7) Bardolino Chiaretto (x2)

PHOTOGRAPHS BY **ADRIAN TAYLOR**

TERMS & CONDITIONS

*Available in the mainland UK only. Please allow seven working days for delivery. Purchasers must be 18 years or over. Offer open to *Ecologist* subscribers. One case per subscriber while stocks last. No customer substitutions. Wines supplied and delivered by Vinceremos Wines, 74 Kirkgate, Leeds, West Yorkshire, LS2 7DJ.

READ THE LABEL SUNSCREENS

Rather than slather liberal amounts of chemicals on our bodies and faces with sun creams and other cosmetics, **Pat Thomas** suggests a little sun exposure might do us good.

Sunscreens protect the skin from the sun's harmful UV rays. They are beneficial. They are desirable. They are necessary. Or so we are told. So why is there so much evidence suggesting that in fact their risks drastically outweigh their benefits?

There are two basic types of creams available on the market today: chemical sunscreens, which act like sponges, absorbing UV light and keeping it from penetrating the skin, and mineral sunblocks, which reflect or scatter light in both the visible and UV spectrum. Both are associated with skin irritation.

Sunscreening chemicals are absorbed into the skin and sunblocks sit on the skin's surface and act like tiny mirrors reflecting UV light away from the skin.

Chemical sunscreens – which are by far the most widely used in commercial products – have some major drawbacks:

- They are more easily absorbed into the skin
- They are powerful free radical generators. Free radicals are the unpredictable molecules which can cause cellular damage and the kind of changes that lead to skin damage
- They often have strong hormone disrupting effects, often mimicking the effects of estrogen in the body
- They are synthetic chemicals that are alien to the human body and in some cases can accumulate in body fat stores. The human body is well adapted to detoxify biological substances that it has been exposed to for over tens of millions of years. But it has often has difficulty removing new and non-biological compounds such as DDT, Dioxin, PCBs – and chemical sunscreens.

The estrogenic properties of sunscreening chemicals are particularly worrying, because chemicals that are estrogenic can fool the body into believing they are natural hormones. This can cause reproductive and menstrual problems and may be a trigger for estrogen dependent cancers of the breast, endometrium, ovaries and prostate.

In the last few years a series of disturbing laboratory and environmental studies have shown just how widespread the problem is in sunscreens. In one Swiss study in 2001, six frequently used UVA and UVB sunscreens – benzophenone-3 (Bp-3), homosalate (HMS), 3. 4-methyl-benzylidene camphor (4-MBC), 4. octyl-methoxycinnamate (OMC), octyl-dimethyl-PABA (OD-PABA), butyl-methoxydibenzoylmethane (B-MDM) – were analysed for their estrogenic potential. All but the B-MDM were found to be estrogenic.

Sun creams can also contain preservatives such as parabens, which are also estrogenic. Since mixtures of different estrogens are known to have a more powerful effect on body tissues than single substances, it is worth asking why no manufacturer has bothered to study the cumulative health effects in humans of applying sun creams on a daily basis.

PHOTOGRAPH BY **CORBIS**

We know what happens in fish however. Recent data shows that male hornyhead turbot and English sole feeding near the outfalls on the California coast are being feminised and oxybenzone, a chemical found in sun creams, is the likely culprit. Two-thirds of turbot and sole were growing ovary tissue in their testes.

European data shows that other sunscreen chemicals - octocrylene and 4-methylbenzylidene camphor – are also building up alarmingly in the fish population and causing gender-bending effects.

Worse, we don't just put them on our skin, we wash them down the drain, and then ingest them in drinking water and in the foods we eat. And as the sunscreen becomes de rigueur in cosmetics of all types, we don't just apply them during the heat of the summer, we apply them all year round, on faces and bodies, men, women and babies and even at night in so-called 'night creams'.

Nanotechnology

Because we apply them so ubiquitously, many healthcare gurus are now recommending that mineral sunblocks, which sit on the skin, may be safer than chemicals that are absorbed into the skin. But even these so-called safer mineral sunblocks have become the subject of controversy. Today many creams use nanoparticles of zinc oxide and titanium dioxide.

Nano-sized sunblocks spread more easily and appear transparent on the skin and this has helped manufacturers get round the aesthetic problem of the thick white pastes of past eras. The problem is that evidence of their safety is sorely lacking. Some manufacturers boast formulations containing zinc oxide nanoparticles as small as the tiniest known viruses. On the one hand, this may seem like a technological breakthrough, but cast in another light it is highly alarming.

Nanoparticles are known, because of their size, to behave in strange and unpredictable ways since, at the nanoscale, quantum physics can take over, and the Newtonian physics of everyday life becomes less dominant. Particles of that size can go anywhere they please. Should they get into the body, for instance, they bypass the entire immune system and pass through the blood-brain barrier that protects the brain.

In 2004, the UK report *Nanoscience and Nanotechnologies: Opportunities and Uncertainties* recommended nanoparticles be treated as 'new chemicals' under UK and European legislation. Doing so would trigger appropriate safety tests, and require that nanoparticles be approved by an independent safety committee before they were permitted for use in consumer products such as cosmetics. Manufacturers have strenuously resisted this, especially since more than 200 nanoparticle-containing products are already on the shelves.

Natural alternatives?

While several sun creams on the market boast natural ingredients, it is important to read the label to see what's really in them. It is impossible to make an entirely natural sun cream. Manufacturers must use either chemical sunscreen or mineral sunblock – often they use a combination of both. So-called natural sun creams will contain as few of these ingredients as possible to achieve the desired sun protection factor (SPF), but they will always contain them.

In addition, they may contain skin protection co-factors such as vitamins C and E, antioxidants like green tea, shea butter, which has a natural though mild sunscreening effect, and emollients such as cocoa butter and emu oil. These natural ingredients are good but they are also, in the end, compromises.

Given the huge benefits of regular sun exposure and the as yet unquantified risks of sunscreens, it might be worth asking yourself if it isn't smarter to get out and enjoy the sun unprotected for short periods each day, and cover up or seek out the shade for the rest of the time.

WHAT YOU CAN DO

1 Look at the labels of your favourite products. Do any of them contain the following chemicals?

- ☐ **Octyl methoxycinnamate (OMC)**
- ☐ **Octocrylene**
- ☐ **Ethylhexyl p-Methoxycinnamate**
- ☐ **Octyl salicytate (OCS)**
- ☐ **Homosalate**
- ☐ **Neo-homosalate**
- ☐ **Octyl salicylate**
- ☐ **Para-aminobenzoic acid (PABA)**
- ☐ **Ethyl dihydroxypropyl PABA**
- ☐ **Octyl dimethyl PABA**
- ☐ **Glyceryl PABA**
- ☐ **Padimate-O**
- ☐ **Oxybenzone**
- ☐ **Avobenzone**
- ☐ **Dioxybenzone**
- ☐ **Sulisbenzone**
- ☐ **Methyl anthranilate**
- ☐ **Digalloyl trioleate**
- ☐ **Zinc oxide**
- ☐ **Titanium dioxide**

2 If so, please photocopy these pages, tick the boxes of the worrying chemicals you have found on your sun cream label and write to the manufacturer's customer services department, asking them why they are using these chemicals in their products and what proof they have that their sun creams actually prevent skin ageing and diseases like skin cancer. In particular, ask them to justify the use of nanoparticles in their products, given the total lack of safety data.

3 Ask the manufacturer to send a copy of their reply to the *Ecologist*, Unit 18 Chelsea Wharf, 15 Lots Rd, London SW10 0QJ or, failing that, pass the reply you do get on to us, as we will be monitoring all feedback for future investigations and campaigns. Thank you!

ECO POWER CAMPAIGN

AIM To meet the UK's energy needs from local, clean, renewable sources

In the UK we need to move from our dependence on non-renewable, air polluting, climate changing, centrally generated, hugely inefficient and increasingly expensive sources of energy – gas (40%), coal (30%), nuclear (20%), oil (5%) – to non-polluting, small-scale energy sources generated as close to users as possible, eg wind, hydro, tidal, solar, biofuels, ground source heat etc.

HOW? Supplying the current (and expected increased) energy demand in the UK, while keeping prices for energy low is IMPOSSIBLE. We either confront this and start to adapt or we stick our heads in the sand and moan about the inexorable rise in our energy bills. Each one of us, starting at home and then moving out into our local communities and workplaces, needs to:

1 **SWITCH our energy SUPPLY to ECOTRICITY**
2 **REDUCE our energy DEMAND**
3 **LOCALISE our energy SUPPLY... individually, and in our communities.**

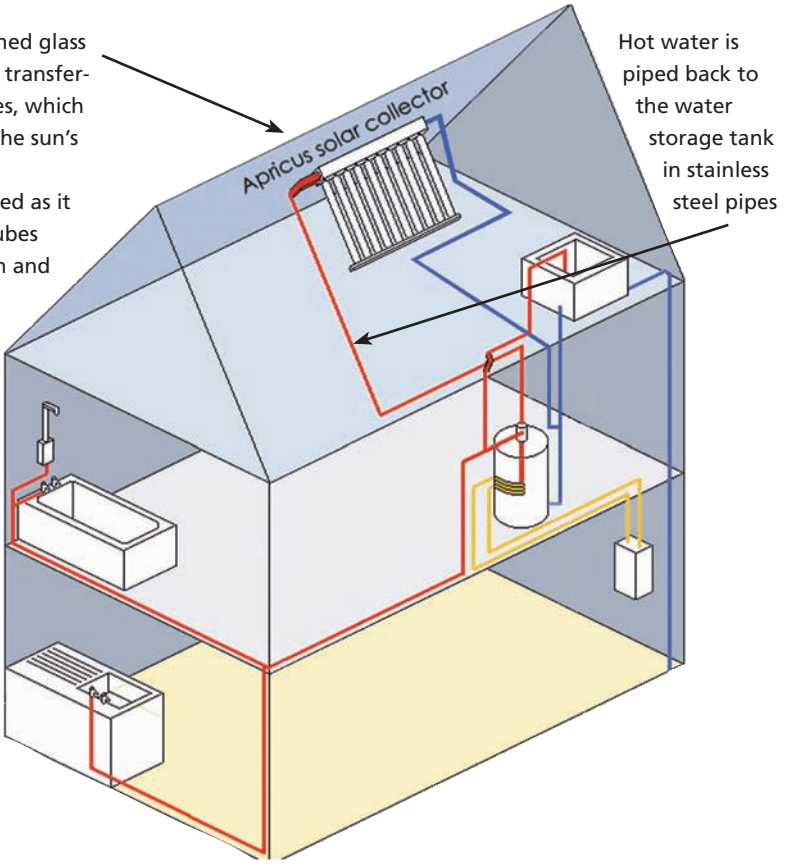
We can't wait for politicians to act, and can't rely on an energy market that profits from rising energy prices and increasing demand. This is why the *Ecologist* and Ecotricity have teamed up to ease your transition from expensive centrally supplied energy to clean, locally supplied energy at home (and at work). Our combined research and practical expertise will ensure that the options we recommend for reducing demand and generating your own supply will work without costing you a fortune.

STEP 4: SUN SHOWERS

25% of energy use in our homes is used to heat water. And yet, for most of the summer months and a surprising amount of the winter too, that water could be heated by the sun – minimizing your CO2 emissions and maximising your use of FREE heat.
All that's needed is a 'solar thermal collector' on your roof - an industry term for a series of pipes running to and fro over a short space through which water passes and is heated up by the sun. No need for expensive photovoltaics or other high tech gear.
And for those of you keen to cut your energy bills, reduce your CO2 emissions, but don't have the time to research the 'solar thermal collector' market – we recommend Powertech's Apricus Solar Thermal Collector. It's well made, well designed and excellent value.

■ Insulated, toughened glass tubes surround heat transfer-efficient copper pipes, which absorb, and retain, the sun's thermal energy
■ Cold water is heated as it flows through the tubes
■ System is corrosion and freeze resistant
■ No drilling during installation. Roof tiles surrounding collector are

May – September: Maintains water at up to 95% of required heat.
October – April: Maintains water at up to 45% of required heat.



HOW MUCH DOES THE APRICUS SOLAR WATER COLLECTOR COST? (Typical 3 bed home)

	PROFESSIONALLY INSTALLED	DIY
Apricus Solar Water Collector (1)	£1,260 (2)	£1,410 (3)
Installation	£400-840 (4)	FREE (5)
MAX COST (6)	**£2,100**	**£1,410**

USEFUL NOTES: (1) Special price of £1,200 for *Ecologist* readers - 30% off the RRP£1,800 – offer valid until 31st August 2006 (2) £1,260 (includes 5% trade VAT) (3) £1,410 (includes 17.5% VAT) (4) All installers of 'Apricus Solar Water Collectors' have been trained by the founder and designer of the system, Eric Hawkins. Cost of installation varies depending on size and location of your house, but is confirmed prior to work starting, once the installer has visited your home. (5) DIY installation. Beginning June 1st, Powertech are offering day-long DIY installation courses every other week at their headquarters in West Parley, North Dorset. The course costs £198 - which will be reimbursed if you decide to install the Apricus Solar Thermal collector. (6) Local government grants may be available – visit www.est.org.uk/myhome.

POWERTECH'S SOLAR THERMAL COLLECTOR SYSTEM

- 15 year warranty
- No maintenance
- Minimal running costs – the pump uses 50W/hour (approx £9 year)
- No planning permission (for most applications!)

Powertech, in association with The Ecologist, is offering readers 30% OFF the Apricus Solar Water Collector System until August 31st 2006.

HOW TO ORDER

Powertech needs to know the following information to tailor the Apricus Solar Water Collector to your home's needs:

1. Do you have a south facing roof?
2. How many litres is your water tank and is it less than 15 years old?
3. Where is your hot water tank located? (which floor of your house)

Please send an email with subject heading 'Ecologist' including your answers to the above, your name, address and telephone number, to Eric Hawkins, **erh@solar.org.uk**, or telephone **01202 890 234.**
Offer valid until August 31st, 2006.

ECO POWER CAMPAIGN

STEP 1: SWITCH TO ECOTRICITY

No matter where you live you can switch your electricity supply to Ecotricity.

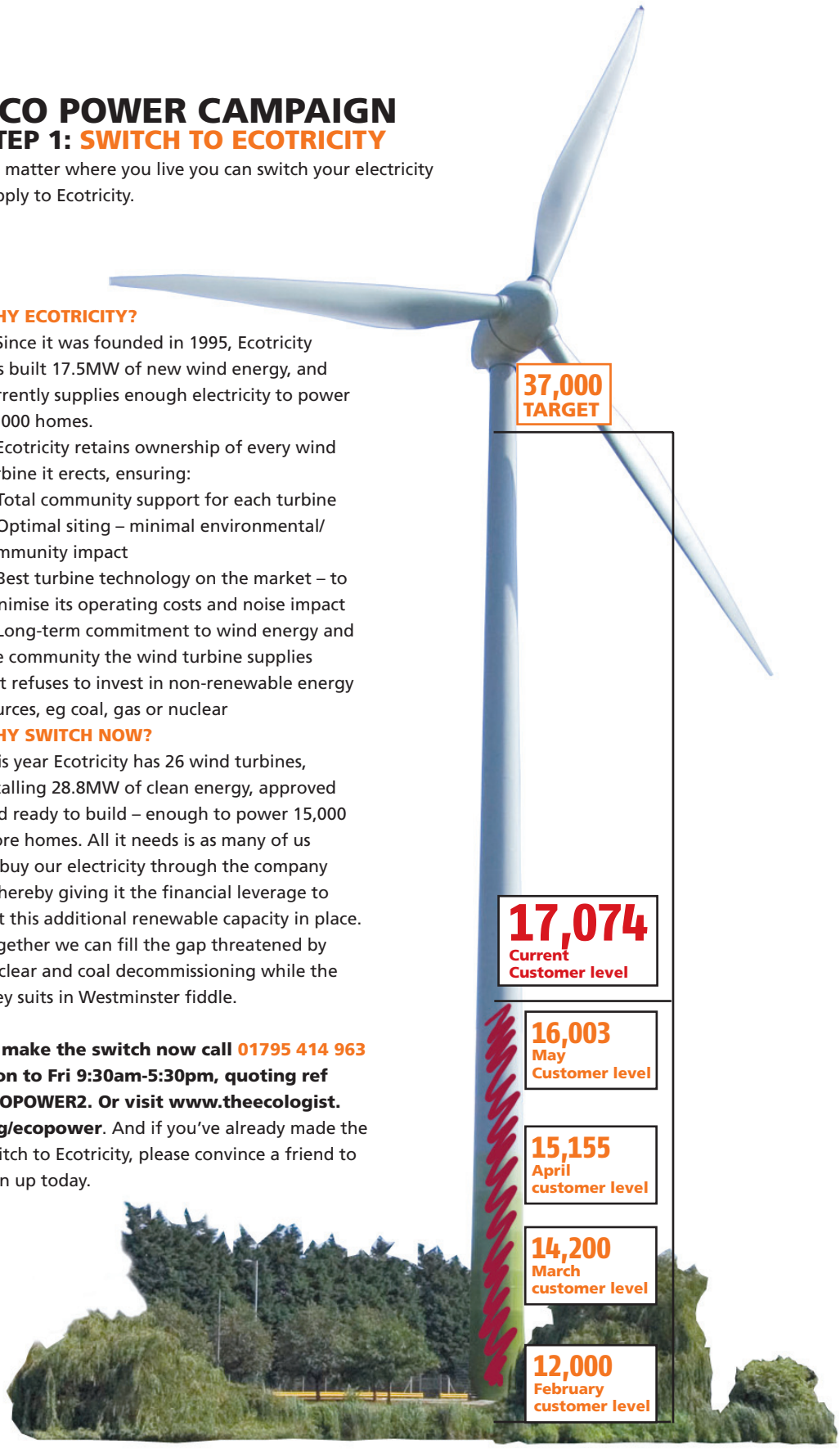
WHY ECOTRICITY?

- Since it was founded in 1995, Ecotricity has built 17.5MW of new wind energy, and currently supplies enough electricity to power 12,000 homes.
- Ecotricity retains ownership of every wind turbine it erects, ensuring:
  - Total community support for each turbine
  - Optimal siting – minimal environmental/ community impact
  - Best turbine technology on the market – to minimise its operating costs and noise impact
  - Long-term commitment to wind energy and the community the wind turbine supplies
- It refuses to invest in non-renewable energy sources, eg coal, gas or nuclear

WHY SWITCH NOW?

This year Ecotricity has 26 wind turbines, totalling 28.8MW of clean energy, approved and ready to build – enough to power 15,000 more homes. All it needs is as many of us to buy our electricity through the company – thereby giving it the financial leverage to put this additional renewable capacity in place. Together we can fill the gap threatened by nuclear and coal decommissioning while the grey suits in Westminster fiddle.

To make the switch now call 01795 414 963 Mon to Fri 9:30am-5:30pm, quoting ref ECOPOWER2. Or visit www.theecologist.org/ecopower. And if you've already made the switch to Ecotricity, please convince a friend to sign up today.



ECO-CLOTHING *News*

LONDON ECO-DESIGN SUMMER FAIR

Womenswear by From Somewhere

Scarves by Denise Bird

Sunday 18th June, 2-6pm

The Eco-design fair will include a range of ethically-produced clothing and accessories, interior design products, cards, toys, gifts, stationery, alternative technology and more. All products contain an element of sustainable design, or/and are ethically produced- organically grown, recycled/recyclable, natural, non-toxic, cruelty-free, fairly traded, and low energy-consuming in production and use. Kid's corner will include a paper and textiles workshop encouraging the re-use of materials. Live music from Madam Sukie Smith and organic refreshments from Primrose Hill Bakery.

Visit **www.ecodesignfair.co.uk** for more details.

Venue: Union Chapel, Compton Avenue (just off Upper Street), London, N1 2XD

Tube: Highbury and Islington

Entry £1. Conc 50p.

Eco-design fair organiser Louise Kamara and Angela Jackson have compiled a guide to Sustainable London. The first 50 *Ecologist* readers to email info@ecodesignfair.co.uk will receive a FREE copy.

Denise Bird Woven Textiles

PICK OF THE MONTH

(Below) Bardot Hanging garden print t-shirt £34 by CIEL.

Made from organic cotton.

ECOLOGIST READER OFFER £24 30% OFF THE RRP

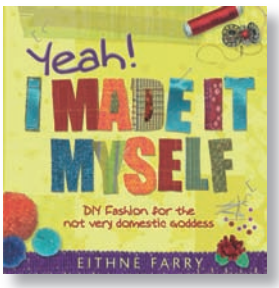
Sizes: S/M/L

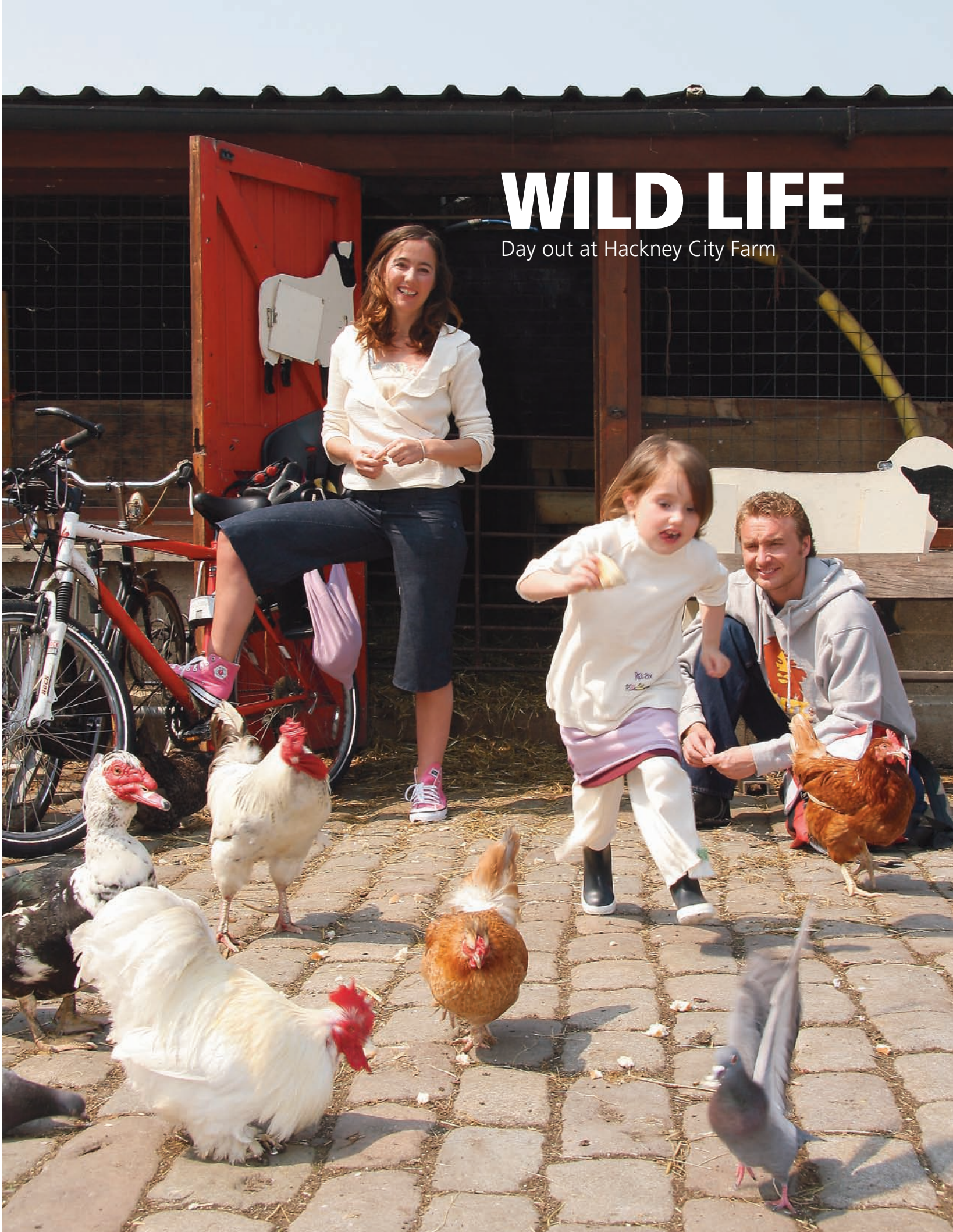
Available by mail order from Equa Clothing, 28 Camden Passage, London N1, www.equaclothing.com, tel: 020 7359 0955

DO IT YOURSELF STYLE

A new guide to 'no-sew sewing'

Eithne Farry's new book *Yeah, I Made It Myself* is a simple, step-by-step guide to turning old curtains into frocks, making home-made knits and getting the best out of second-hand fabrics. (£10.99 Weidenfeld & Nicolson)





WILD LIFE

Day out at Hackney City Farm

HOW TO FIND OUR FEATURED *clothing*

MUM

■ **Natural cream waffle top £55 by ClothWORKS**
Wrap over top made from organic cotton and organic linen, with a cotton fluted collar.
Sizes: S/M/L **Range:** cream / pale grey from www.clothworks.co.uk
To buy: available by mail order tel: 01225 309218.
Designer Linda Row's clothes are made from organic cotton, organic linen or hemp, using only natural or eco-friendly dyes. No synthetic interlinings are used and labels are printed onto organic scraps. Made in England.

■ **Ivory camisole £55 by Enamore**
60% hemp, 40% silk with vintage print detail.
Sizes: 10-14
To buy: available by mail order from **www.thenaturalstore.co.uk**, tel: 01273 746781.
Designer Jenny McPherson uses recycled fabrics (from charity shops and boot sales) and organic textiles. Materials include hemp, cotton, silk and bamboo. Handmade in Brighton.

■ **Jean cropped trousers £125 by CIEL**
Made from bamboo denim
Sizes: 8-14 **Range:** blue and white linen
To buy: Available by mail order from Equa Clothing, 28 Camden Passage, London N1, www.equaclothing.com, tel: 020 7359 0955
Designer Sarah Ratty uses whatever eco-friendly fabrics she can get her hands on. Made in England.

■ **Pink trainers £35 by No Sweat**
Sizes: 3-12 **Range:** Classic black, code black and MoJo red
To buy: Mail order from www.getethical.com.
Fair Trade trainers. 100% vegan and animal free. Hand sewn with a tough canvas upper and rubber sole. Each pair ships with details of workers' wages and benefits.

DAD

■ **Hinditonic t-shirts £20 by Tonic**
ECOLOGIST READERS GET 10% OFF - ORDERS OF TWO OR MORE 20% OFF
Valid until June 30th
Sizes: S-XL **Range:** light blue, brown, slate, light grey
To buy: mail order from **www.tonictshirts.com**, tel 020 8543 5496. To receive reader discount quote (or type in website) special offer code 'ecologist'.
Tonic offers original designs on sweatshop-free, fairly traded and organic cotton men's and women's t-shirts and hoodies.

■ **Priory jeans £85 by Howies**
Sizes: 30-38 (regular and long sizes)
To buy: mail order from www.howies.co.uk, tel 01239 614122
Organic, hand brushed denim. A percentage of Howies turnover/profits donated to grass roots environmental and social projects.

■ **Babylon hoodie £55 by THTC**
ECOLOGIST READERS GET 10% OFF ALL THTC PRODUCTS UNTIL JULY 14TH
55% organic hemp, 45% certified organic cotton.
Sizes: M,L, XL (men's), 10-12 (ladies) **Range:** grey and black on a variety of prints
To buy: available by mail order from www.thtc.co.uk. To receive reader discount type in special offer code 'Ecologist0606'.
THTC aim to bring hemp and eco-fibres onto 'the street'. Also sell organic hemp and cotton t-shirts with designs made to order. Visit **www.Eco-t.co.uk.**

■ **Blackspot Unswoosher shoes, from £65, by Adbusters**
Made from organic hemp uppers, with soles made from reclaimed used tyres.
Sizes: men's 6.5-12, women's 3-7.
To buy: available by mail order from **www.adbusters.org** (takes two weeks) or in selected independent shops. To find one nearest you visit **http://adbusters.org/metas/corpo/blackspotshoes/retail/**

TODDLER

■ **Lilac a-line skirt, £15, natural trousers £11 and natural top £11 all by Tatty Bumpkin**
Sizes: 1-2 yrs, 2-3yrs, 4-5yrs, 6-7yrs
Range: Navy/purple (trousers), Lilac/orange (top)
To buy: mail order from www.tattybumpkin.com or tel: 01732 812212.
Sam Petter, yoga teacher and founder of Tatty Bumpkin, developed a range of organic cotton, colourful and ultra-comfy children's clothing.

SPECIAL THANKS TO HACKNEY CITY FARM

Hackney City Farm provides an opportunity for city dwellers to experience and learn about Farming and the Countryside. Its bustling Farm Yard has a wide range of animals and has a small Cottage Garden in which volunteers grow an array of fruits and vegetables. Arts and Crafts activities are available for adults and children.
Entry is free. Open from 10am -4:30pm six days a week (closed on Mondays).
Visit **www.hackneycityfarm.co.uk**

PRODUCTION & STYLING: **ELIZABETH LASKAR AND PAMELA DANIELS**. PHOTOGRAPHY **NATALIE PECHT**. HAIR: **LAUREL STAPLE USING AVEDA**. HAIR ASSISTANT: **MAGS O'CONNOR**. MAKE-UP: **HAZEL BURFORD FROM GREASEPAINT USING AVEDA**. MODELS: **MIA MANNERS, METTA ANGEL MANNERS, GERARD JOHNSON**. VENUE: **HACKNEY CITY FARM**

COMMUNITY ORCHARDS

Paul Kingsnorth on how easy it is to grow rare apple trees, and how to wassail them with cider and singing

Eggleton Styre. Scarlet John Standish. Gravenstein. Cockagee. Kirkston Pippin. Laxton's Superb. Foxwhelp. Lady Henniker. Cornish Honeypin. A pat on the back if you've even heard of any of these. A gold star if you've ever eaten one. And an unsurprised look if you don't know what I'm on about.

These are all apples, of which an estimated 2,000 different varieties have been traditionally grown in England, once the apple capital of the world. The climate and soil in the parts of the country once famed for their orchards – Kent, Worcestershire, Herefordshire and Somerset – are perfect for growing mind-boggling varieties of this remarkable fruit.

It would make sense, then, in this age of farmers' markets and rocketing interest in local food, for the English apple to be enjoying a resurgence. And yet our ancient orchards are falling like ninepins. In the late nineteenth century, 186,000 acres of England grew fruit trees, today it is just 44,000 acres, and falling. The area under apple trees has halved since 1994.

The rise of supermarkets, above all else, has killed them off. It's easier and cheaper for Asda, et al to sell one or two varieties, selected not on grounds of taste but on their ability to survive long-distance transport and look clean on the shelves. Superstores in the middle of counties famed for their orchards sell only Golden Delicious, imported from France. It's a heartbreaking sight.

Fascinating, I hear you say, but aren't you supposed to be writing about allotments? Well, I am – and here's why. In my view, it's imperative that the remarkable diversity of our national fruit survives another century; and while neither politicians, supermarkets or many consumers seem remotely interested in helping it do so, there are ways that you and I can.

Fortunately, helping to save the English apple is not as hard as it sounds; and this is where your allotment comes in. Most of us are never going to own a traditional orchard and probably wouldn't want to, but if you have an allotment – or even a small back garden – you can create your own little Eden. You'll need to check that your allotment association allows you to plant fruit trees, but most seem to. If they do, you're up and running.

Eighteen months ago I got together with a few friends and did just this. We got ourselves two adjacent plots and decided to turn them into an orchard of rare trees. One of my co-conspirators, who has developed into something of an apple obsessive, began scouring nurseries for rare varieties – again, not as hard as it sounds (see box for starters). The planting itself is easy enough – big hole, lots of manure, regular watering – and once the trees are in they are incredibly low maintenance compared to a plot full of leeks or courgettes. In future years, your countryfolk may thank you. If they don't, well stuff them. You still have the apples.

Apples are intimately tied to place, history and the distinctive character of local landscape, and there's a whole ceremonial tradition that goes with them. Such as the ancient ritual of 'wassailing', intended to bless and protect the trees for the coming year. Traditionally carried out in December, we decided to shift the date to a considerably warmer one associated with nature rituals.

This May Day, we trooped down after work with several bottles of cider, a barbecue and a history book to wassail our trees for the first time. Following our ancestors' curious ways, we soaked pieces of cake in cider, tied them to tree branches, stood around it singing an ancient wassail song, then watered its roots with cider before watering ourselves.

Sitting around a fire on hay bales in the pink-blossoming orchard, the pink sun sinking behind the housing estate, it was hard to think of a better way to spend the evening.

■ Email me: **paul@paulkingsnorth.net**

SAVE OUR APPLES!

PLACES TO START

■ **Brogdales National Fruit Collection**
Buy online or visit the nurseries of this, the largest collection of fruit trees in the world.
www.brogdale.org

■ **Bernwodes**
Sell traditional and rare apple varieties.
www.bernwodeplants.co.uk/apples.htm

■ **Marcher Apple Network**
Network of enthusiasts from the Welsh borders dedicated to saving rare apples.
www.marcherapple.net

■ **England In Particular**
Inspiring website run by Common Ground, full of curious and fascinating apple facts.
www.england-in-particular.info/orchards/o-index.html

GREEN SHOPPING GUIDE

Make every £1 you spend count

READER OFFERS

AURO

NATURAL PAINTS AND WOOD FINISHES

NATURAL PAINTS FROM START TO FINAL FINISH

YOU'LL BE HEAD OVER HEELS WITH OUR NATURAL PAINTS.

- Using only natural, plant and mineral raw ingredients we have a closed cycle of sustainability.
- Manufactured using solar energy and wind power to lower CO^2 factory emissions.
- Certified organically grown linseed oil is a major component of our paints and wood finishes.
- So pure, any left over paint can be dried and composted
- All of our finishes are micro-porous, allowing wood and plaster to breathe for a healthy living environment.
- Our water based, solvent free paints and wood finishes are hypoallergenic, making them great to use for allergy sufferers.

Please see our web for details of nearest stockists nationwide, or give us a call for a brochure, pricelist and expert advice.

www.auro.co.uk

tel: 01452 772020

Order online through our affiliate partner at
www.ecopaints.co.uk

London stockists include:
'Succession' in Chelsea (0207 2599888) and
'Mother Earth' in Islington (0207 3549897)

Dear Reader

At the *Ecologist*, we have a vision of vibrant, self-sustaining communities, full of locally owned and supplied independent shops and businesses providing all of a community's diverse needs.

Yet today's reality is something altogether different. Chain stores and supermarkets are choking the life out of communities. Money, which once circulated within communities, now lines the pockets of distant head offices and shareholders. Where once there were towns and villages with unique identities, there are now identikit, one-size-fits-all high streets.

So what can we do?

First off, we all can make a difference by shopping from our local independents whenever we can. For those of us bereft of genuine local shops, use this guide to shop ethically via the web and bring us one step closer to the vibrant real communities we long for.

This guide has been carefully put together to include inspiring and independent producers and retailers who are committed to offering products and services that:

- are non toxic to you and the environment
- ensure highest standards of animal welfare
- support local communities
- offer a fair wage and decent working conditions to all parts of the supply chain
- use minimal packaging
- minimise transport miles.

Finally if you've already shopped at one of the retailers listed in this guide, tell us (gsg@theecologist.org), and them, what you think. If you're unhappy, don't move on silently. We need all the support we can get!

Matilda Lee
Editor, Green Pages

FOOD & DRINK

CLUB STATS: Headquarters in Belgium • Employs 77,000 people • Two hundred brands • 23,560,000,000 litres of beer sold in 2005.
TEAM TACTICS: Maximise output and shareholder return by minimising cost. Standardise production into industrial brewery complexes. Close original brewing sites and axe jobs. Bulk buy ingredients. Hog the global market.
MANAGER: Carlos Brito, CEO. Previously worked for Shell Oil.

INBEV PLAYERS:

1. STELLA ARTOIS Belgium import aka 'wife beater'. Loves labels. Fashion victim. Typically fizzy. Over-hyped. Lacks substance.
2. BECK'S German import. Bit of a bore. Plays it safe on taste: basic, light and bland. Over promoted: sold in 120 countries.
3. BUDWEISER The US 'King of Beers' is a pale shadow of a beer. Lightweight. Feebly hopped. Sickly sweet. Fails to deliver. Drink cold to numb the palate to its offensive flavour.
4. BODDINGTONS Weak tasting. Thick and sweet. Lost its roots when InBev forced the Manchester Boddingtons brewery to close in 2005 – 227 years of brewing history down the drain.
5. SKOL SUPER 9% A very strong lager. 'Horrible tasting'. Cuts corners. Smells bad. Added syrup and caramel. Beware. You'll regret it.
6. HOEGAARDEN Lost its authenticity in December 2005 when InBev announced the closure of the Hoegaarden brewery. Cost cutting in Belgium: 232 jobs axed.

CLUB STATS: Headquarters: Black Isle, Scotland • Employs five full-time and two part-time staff • Six varieties of locally brewed beer • 300,000 litres of beer brewed in 2005.
TEAM TACTICS: Maximise authenticity, quality and taste. Experiment with organic ingredients grown locally. Keep it natural (bottle conditioned beer needs no filtering, artificial carbonating or fining.) Minimise waste. Leftover draft mealy mixture is fed to local cattle and sheep whose manure fertilises the barley fields. Glass bottles – 100% recyclable.
MANAGER: David Gladwin: Previously worked for Moniack winery

BLACK ISLE PLAYERS:

1. YELLOWHAMMER Refreshing bitter. A golden contender brewed with Cascade hops. Flinty, grapefruit aroma. Natural talent.
2. RED KITE ALE Amber coloured quenching ale. Creamy head, dream player. Balanced and multi-talented. Vivid, fruity and hoppy.
3. BLONDE Continental style white beer with bite. Fresh grassy aroma. Attractive, exotic and idolised by women.
4. WHEAT BEER Quenching power. Brewed with orange and coriander. Fresh star in the making. Light and moreish.
5. SCOTCH ALE Ruby coloured full ale made with peat smoked malt and bog myrtle. Fruity, herbal and adventurous. Experienced crowd pleaser.
6. ORGANIC PORTER Ruby black beer. Dry, dark, rich roasted. Grown-up charm. Subtle, smooth and creamy.

ecologist READER OFFER – 10% OFF A CASE OF BLACK ISLE BEER

The Ecologist has teamed up with Black Isle Brewery to offer readers a World Cup special.
Case of 12 beers for £28.35 (incl delivery)
To redeem this offer simply go to **www.blackislebrewery.com**, select the mix of 12 beers you'd like, and add '*Ecologist* Reader Offer' in the 'Where did you hear about us' box at the end of the form. Offer valid until June 30 2006.

FRESH PRODUCE

Why not free yourself from the overly packaged, non-ripe and tasteless varieties of supermarket produce and visit one of the excellent online producers below? They will deliver their genuinely fresh, seasonal fruit, veg, fish and meat direct to your door. And you can feel safe in the knowledge that you're buying environmentally sound, locally sourced, delicious produce that meets the highest animal welfare standards.

FRUIT & VEGETABLES

Do you live near a farmers' market? For a list of farmers' markets around the country go to www.theecologist.org/farmersmarket. Along with greengrocers, farmers' markets are a great source for locally produced, fresh, seasonal fruit and veg. If, however, you don't live near a greengrocer or farmers' market, the next best way to get your fruit and veg is to sign up for a local box scheme. For 15 reasons to join one, and a list of suppliers throughout the UK, go to **www.theecologist.org/boxscheme**

ORGANIC BEEF, LAMB, PORK & POULTRY

No local butcher? Reliant on heavily processed, packaged and factory-reared supermarket meat? Find out what meat should really taste like – order your next steak online . . .

Graig Farm Organics
www.graigfarm.co.uk
Higher Hacknell Farm
www.higherhacknell.co.uk
Sheepdrove Organic Farm
www.sheepdrove.com
The Real Meat Company
www.realmeat.co.uk
Well Hung Meat
www.wellhungmeat.com

How can I be sure my meat will arrive fresh? Fresh meat and fish is carefully wrapped in insulated boxes with ice packs, ensuring that frozen goods stay frozen and chilled items stay chilled.

What happens if my delivery arrives and I'm not in? Carriers can be instructed to leave your delivery in a safe place, with a neighbour, or at a local shop. The companies listed in this guide will do their utmost to cater to your specific needs – if you are not at home – please do let them know and alternative arrangements can be made.

FRESH FISH

No local fishmonger? Want your omega-3 fatty acids without further endangering chronically depleted fish stocks? Have your sustainably caught / reared fish delivered to your door.

Inverawe Smokehouses
www.smokedsalmon.co.uk
The Organic Smokehouse
www.organicsmokehouse.com
Deverill Trout Farm
www.purelyorganic.co.uk
Graig Farm Organics
www.graigfarm.co.uk

may in season

VEGETABLES:

Aubergines
Asparagus
Beans: Broad, French , runner
Broccoli
Carrots
Cauliflower
Courgettes
Cucumbers
Fennel
Perennial herbs: Such as sage, thyme and rosemary; produce leaves all year round
Kohlrabi
Lettuce
Mushrooms
Peas: Shell, mangetout, sugarsnap
Radishes
Shallots
Spinach
Spring onions
Summer squash
Swiss chard
Turnips
Watercress

FRUIT:

Currants
Gooseberries
Raspberries
Strawberries
Tomatoes

STORE CUPBOARD ESSENTIALS

What could be more convenient than having all your cooking 'essentials' delivered to your door once a month...

Buxton Foods
www.buxtonfoods.com

Graig Farm
www.graigfarm.co.uk

Goodness Direct
www.goodnessdirect.co.uk

Hider
www.hider-foods.co.uk

Naturally Good Food Ltd
www.goodfooddelivery.co.uk

Real Food Direct
www.realfooddirect.co.uk

Traidcraft Plc
www.traidcraft.co.uk

ECOLOGIST ACTION

FOOD-BUYING GROUPS

Why not club together with a bunch of friends and buy from the following food wholesalers – and save huge amounts of money on good, local, organic 'essentials'.

Clearspring
www.clearspring.co.uk

Community Foods
www.communityfoods.co.uk

Eostre
www.eostreorganics.co.uk

Essential Trading
www.essential-trading.coop

Organico
www.organico.co.uk

Suma
www.suma.co.uk

DRINK

BEERS, ALES & CIDER

Beers in a Box
www.beersinabox.com
Black Isle Organic Beers
www.blackislebrewery.com
Broughton Ales
www.broughtonales.co.uk
Dunkerton's Cider and Perry
www.orchard-hive-and-vine.co.uk
Freedom Organic Beer
www.freedombeer.com

WINE

Festival Wines
www.festivalwines.co.uk
Pure Wine
www.purewine.co.uk
Vinceremos
www.vinceremos.co.uk
Vintage Roots
www.vintageroots.co.uk

SPIRITS

Juniper Green Organic Gin
www.junipergreen.org
Stonelink Farm (organic sloe gin)
www.stonelinkfarm.co.uk

COFFEE

A Lot of Coffee
www.alotofcoffee.co.uk
Café Direct
www.cafedirect.co.uk
Equal Exchange
www.equalexchange.com
Origin
www.origincoffee.co.uk
The Bean Shop
www.thebeanshop.com

3 SIMPLE STEPS TO WASTEBUSTING!

MORE THAN HALF OF YOUR RUBBISH ISN'T RUBBISH AT ALL

1 Feed the WasteBuster plate scraps, old clothes, coffee grinds, fruit and veg peelings and cardboard.

2 Watch as the worms get to work and transform them into rich composting soil.

3 Jiggle the tray to let the vermicompost sift through.

£139 incl VAT + FREE delivery, normally £157

GREAT PRICE!

Call
01254 820 088
quoting ref *Ecologist*
Wastebuster Offer

Midi WasteBuster Worm Composter

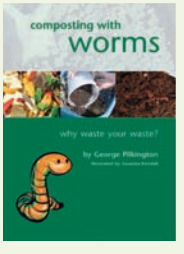
Made from FSC wood, 64cmH x 45cmW x 54cmD. Includes worms, worm bedding and full instruction manual. Perspex viewfinder let's you watch the worms' progress. Suitable for 4-6 family members and for school groups and classrooms.

The best worm compost system around

Designer and vermicompost expert, George Pilkington, has developed the most natural, efficient and easy way to compost household food scraps and organic material using worms:

- **No smell**
- **No handling of waste**
- **Hygienic**
- **Secure for indoor and outdoor use.**

WASTEBUSTER'S GUIDE! JUST £6.99



Composting with Worms by George Pilkington. He's packed 20 years of experience into a family guide that explains: how worms turn waste into compost, the best uses for worm compost and what to do when good bins turn bad. The perfect companion for your WasteBuster. **Call 0117 942 0165**

BUILDING & MAINTENANCE

DIY ESSENTIALS

Building materials, flooring, insulation, paints and windows & doors

Construction Resources
www.constructionresources.com

Ecomerchant
www.ecomerchant.co.uk

Green Building Store
www.greenbuildingstore.co.uk

The Green Shop
www.thegreenshop.co.uk

The Healthy House
www.healthy-house.co.uk

Nigel's Eco Store
www.theinsightecostore.com

CONSTRUCTION/RENOVATION

Cob in Cornwall
www.cobincornwall.com

Concept Timber
www.concept-timber.co.uk

Finch Macintosh Architects
www.finchmacintosh.co.uk

Gale and Snowden
www.ecodesign.co.uk

Insideout Buildings
www.iobuild.co.uk

Nicholas Hare
www.nicholashare.co.uk

Mike Wye and Associates
www.mikewye.co.uk

Quattro Design
www.quattrodesign.co.uk

PAINTS

Auro Organic Paints
www.auro.co.uk

Earth Born Paints
www.earthbornpaints.co.uk

Ecomerchant
www.ecomerchant.co.uk

Ecopaints
www.ecopaints.co.uk

Eco Solutions Ltd
www.ecosolutions.co.uk

Nutshell Natural Paints
www.nutshellpaints.com

The Green Shop
www.greenshop.co.uk

TILES

Natural Tile
www.naturaltile.co.uk

Siesta Cork Tile Co
www.siestacorktiles.co.uk

TIMBER

Altham Hardwood Centre
www.oak-beams.co.uk

Victorian Wood Works
www.victorianwoodworks.co.uk

WOOD FLOORING

Treework Flooring
www.treeworkflooring.co.uk

INTERIORS

BEDDING & LINEN

Albatross
www.albatross-global.com
Green Fibres
www.greenfibres.com
Liv
www.liv.uk.com

FURNITURE NEW

Arbor Vetum
www.arborvetum.co.uk
Rawnsley Woodland Products
www.cornishwoodland.co.uk

RECYCLED & SALVAGED

Reclaimed Pine Online
www.reclaimed-pine-online.co.uk
Treesave Reclamation Ltd
www.buresreclamation.co.uk
Viking Reclamation
www.reclaimed.co.uk

CLEANING PRODUCTS

Ecotopia
www.ecotopia.co.uk
Ecover
www.ecover.com
Greenlands
www.greenlands-env.co.uk
Natural Collection
www.naturalcollection.com
Vertue
www.vertue.com

WATER

CONSERVATION

Eco Logic
www.ecologicuk.com
Hippo the Water Saver
www.hippo-the-watersaver.co.uk
Tap Magic
www.tapmagic.co.uk

PURIFICATION

Earthly Goods
www.earthlygoodsgroup.co.uk
Pure H20
www.pureh2o.co.uk
Simply Water
www.simplywater.com

RAINWATER HARVESTING

Centre for Alternative Technology
www.cat.org.uk
Envireau Rainwater Management
www.envireau.co.uk
Free Rain
www.freerain.co.uk
Rainharvesting systems
www.rainharvesting.co.uk

HOME ENERGY

ELECTRICITY

RENEWABLE ENERGY TECHNOLOGIES
(wind, hydro, solar PV)
Dulas Ltd
www.renewable-resources.com
HiTech Energy Ltd
www.hitechenergy.co.uk
Wind and Sun Ltd
www.windandsun.co.uk

LIGHT BULBS
Energy Saving World
www.energysavingworld.co.uk
Energy Savers Direct
www.energysavers-direct.com
Nigel's Eco Store
www.theinsightecostore.com

SUPPLIERS
Ecotricity
www.ecotricity.co.uk

WOOD FUEL STOVES

Chilli Penguin Stoves
www.chillipenguin.co.uk
Ebc wood fuels
www.ebc-ecofuel.co.uk
Rural Energy Ltd
www.ruralenergy.co.uk
Wood Energy Ltd
www.woodenergyltd.co.uk

SOLAR WATER PANELS

Solar Twin
www.solartwin.com
Sustainable Energy Installations
www.sustainable-energy.org.uk

GROUND SOURCE HEAT PUMPS

Conservation Engineering Ltd
www.heating-designs.co.uk
Eco Heat Pumps
www.ecoheatpumps.co.uk
Geothermal Heating International
www.geoheat.co.uk
Green Systems
www.greensystems.net
Groenholland UK Ltd
www.groenholland.com
Ice energy
www.iceenergy.co.uk
Kensa Engineering Ltd
www.kensaengineering.com
Powertech Solar
www.powertech-solar.com

GARDEN

GARDEN ESSENTIALS *Compost & wormeries, garden furniture, pest & weed control, seeds, soil and plant care.*

British Eco
www.britisheco.com
Green Gardener
www.greengardener.co.uk
The Organic Gardening Catalogue
www.OrganicCatalogue.com

FERTILISERS

Enviromulch
www.wbpenviromulch.com
Fertile Fibre
www.fertilefibre.co.uk
Rooster Pelleted Manure
www.rooster.uk.com

FURNITURE & FENCING

English Hurdle
www.hurdle.co.uk
Forest Stewardship Council
www.fsc-uk.info
Pendlewood
www.pendlewood.com
Wilderness Wood
www.wildernesswood.co.uk

NURSERIES

Ryton Organic Gardens
www.hdra.org.uk
Landlife Wildflowers
www.wildflower.org.uk
National Wildflower Centre
www.nwc.org.uk

Tamar Organics
www.tamarorganics.co.uk
The Natural Collection
www.naturalcollection.com

SEEDS

EXCHANGE
Flora Locale
www.floralocale.org
Henry Doubleday Research Association
www.hdra.org.uk

SUPPLIERS
Kokopelli Seeds
www.organicseedsonline.com
EcoSeeds
www.ecoseeds.co.uk
Tamar Organics
www.tamarorganics.co.uk
The Real Seed Catalogue
www.realseeds.co.uk

CLOTHING

Want to look good, but don't want to support sweatshops, pesticide abuse or dull brands? Then these online clothing retailers are for you. All stock a range of well-made, stylish and ethical clothes.

CLOTHING DESIGNERS

50/50
www.5050clothing.com
Ciel
www.ciel.ltd.uk
ClothWORKS
www.clothworks.co.uk
Enamore
www.enamore.co.uk
Junky Styling
www.junkystyling.co.uk
Keep and Share
www.keepandshare.co.uk
Natural Dye Company
www.naturaldyecompany.com
Natural Store
www.thenaturalstore.co.uk
Pachacuti
www.pachacuti.co.uk
Pierre Garroudi
www.pierregarroudi.com
Romp
www.romp.uk.com
Sari
www.saricouture.com

MEN & WOMEN'S CASUALWEAR

Bishopston Trad. Comp
www.bishopstontrading.co.uk
Green apple
www.the-green-apple.co.uk
Green Fibres
www.greenfibres.co.uk
Howies
www.howies.co.uk
Natural Collection
www.naturalcollection.com
People Tree
www.ptree.co.uk
Seasalt
www.seasaltorganic.co.uk

DON'T PANIC – IT'S ORGANIC

Natural bodycare and cosmetic products are just as effective as their conventional counterparts, but because they don't rely on plastics, synthetic colours and chemicals preservatives, you will find that their range, application and usage can be different. Here's what to bear in mind when using natural products:

Natural cosmetics

• Lip glosses are safer than lipsticks because they contain less potentially toxic colour, but they won't last as long because they don't contain plastics and film formers

• Mascaras won't dry as quickly, lengthen or be waterproof like conventional mascaras because they don't contain synthetic fibres or plasticsa

• Eye shadows will come in a more limited range of 'earth' colours because they will be based on a pallet of mineral and plant dyes

• Choose cream blush instead of powders to avoid potentially cancer-causing talc

• Avoid sparkly make-up which can contain ecologically unsound mica

Natural bodycare products

• Choose moisturisers based on single oils (plant or animal based) rather than complex mixtures of oil, water, preservatives and film forming ingredients. These may feel more oily on your skin at first but will be fully absorbed fairly quickly.

• Natural toothpastes should be fluoride-free and won't foam as much as conventional ones because they won't contain detergents like sodium lauryl sulphate.

BODYCARE & COSMETICS

SANITARY PROTECTION

What are your tampons and pads made from?

Most of today's tampons and pads do not offer women a natural and chemical free choice in feminine care because they are made from a blend of conventionally grown cotton and synthetic and plastic materials. Chlorine-bleached rayon and rayon-cotton blends are widely used in the manufacture of tampons. Dioxin found throughout the environment in varying levels, is a by-product of chorine bleaching and should be a real concern for women as they have been found to collect in the fatty tissues of animals, including humans.

Currently, there is no specific policy or guideline outlining acceptable exposure levels to dioxins. A large amount of the world's production of dioxins is created during the manufacturing process of certain chlorinated products such as paper pulp, used in the production of, amongst other things, tampons, toilet paper, diapers and sanitary pads. This is not only harmful to the environment, but potentially unnecessarily exposes women to low levels of dioxins every time they use these products. Evidence is growing that even

low levels of dioxins may be linked to cancer, endometriosis, low sperm counts and immune system suppression. Considering a woman may use as many as 11,000 tampons in her lifetime, she may be subjecting herself to additional and avoidable dioxin exposure.

Natracare tampons are made from 100% organic cotton that is not chlorine bleached and are free from rayon, binders, surfactants, resins and fragrances. Natracare pads do not contain polyacrylate absorbents or plastics which, when close to the skin, may cause irritation.

WIN A FREE PACK OF NATRACARE PRODUCTS

The Ecologist, in association with Natracare, is offering 25 readers a free pack of Natracare sanitary products worth over £11

PACK INCLUDES:
Ultra Regular Pads with wings, Curved Regular Pads, Breathable Panty Liners, Regular Tampons with applicator (16), Regular Tampons without applicator (10), Regular Tampons without applicator (20)

Simply email **gsg@theecologist.org**, including your name, address and telephone number. The first 25 emails received will win the Natracare pack. Offer limited to one per person.

BODYCARE ESSENTIALS

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

Akamuti
www.akamuti.co.uk
Barefoot Botanicals
www.barefoot-botanicals.com
Earthbound Organics
www.earthbound.co.uk
Essential Care
www.essential-care.co.uk
My Being Well
www.mybeingwell.com
Pure Nuff Stuff
www.purenuffstuff.co.uk
The Organic Pharmacy
www.theorganicpharmacy.com
Pure Skin Care
www.pureskincare.co.uk

SANITARY PRODUCTS

Natracare
www.natracare.com
Menses
www.menses.co.uk
The Mooncup
www.mooncup.co.uk

ECOLOGIST ACTION
MAKE YOUR OWN

Everyone's skin is different, so why not make your own bodycare products and cosmetics at home to suit your needs? The websites listed below will help guide you through ingredients that work for your skin and hair type, and offer a range of ideas for customising your favourite natural scents.

Aromantic
www.aromantic.co.uk
Bay House Aromatics
www.bay-house.co.uk
Cosmetics at Home
www.cosmeticsathome.co.uk
New Directions
www.newdirectionsuk.com
The Soap Tub
www.meltsandpoursupplies.com

DON'T KNOW YOUR GLYCERYL LAURATE FROM YOUR DECYL GLUCOSE?

Find out what the words in your bodycare products really mean….

THE 'BEHIND THE LABEL' SERIES IS NOW ONLINE!
Go to www.theecologist.org/behind_the_label.asp

Past features by Ecologist Health Editor, Pat Thomas, include:
Clearasil deep cleansing 3 in 1 wash
Nivea moisturiser
Clairol Nice 'n Easy Hair Dye
Radox Herbal Bath with Juniper
Oil of Olay

HEALTH & HOMEOPATHY SPECIALISTS

Ainsworths
www.ainsworths.com
Helios Homeopathic Pharmacy
www.helios.co.uk
Optima
www.optimahealthcare.co.uk
Pure Potions
www.purepotions.co.uk
Revital
www.revital.com
The Organic Health Shop
www.baughdell.co.uk

the mission

The amount of baby gear we purchase in the name of 'good' parenting- nappies, wipes, bottles, car seats, pushchairs, clothes, shoes, toys and other nursery items - is staggering. Given the ongoing expense of raising a child and the heavy competition that exists between different manufacturers for parents' custom, it's little wonder that many of the most common baby and child accessories have been made in sweatshops using chemicals that harm both our children's health and the environment.

THIS IS NOT ACCEPTABLE

We challenge the BABY & CHILD industry to make products with:
- **No potential carcinogens, neurotoxins and reproductive toxins**
- **No artificial additives, colourings or perfumes**
- **No petrochemicals**
- **No synthetic fibres**
- **Minimal packaging**
- **Organic ingredients**
- **Stop marketing to children under 16 years old**

What we can do as consumers
- **Read and understand the label**
- **Buy fewer products**
- **Buy reusable products, eg cloth nappies**
- **Make our own, eg food**
- **Challenge stockists to sell safer products**
- **Support the small, independent and ethical producers and retailers in these listings.**

BABY & CHILD

Why use disposables when cloth nappies are easy to use, easy to clean and best for your baby?

1 **Lay open baby-shaped cotton nappy**

2 **Place flushable liner on top for easy removal of poo**

3 **Close using adjustable poppers**

4 **Add the waterproof wrap**

8 MILLION DISPOSABLE NAPPIES GO TO LANDFILL EVERY DAY

BABY ESSENTIALS

Includes bedding, breastfeeding equipment, maternity clothing, nappies (both cloth and eco disposable), nursery furniture, slings, skin and body care and toys and games.

Born
www.borndirect.com
Green Baby
www.greenbaby.co.uk
Greenfibres
www.greenfibres.co.uk
Hejhog
www.hejhog.co.uk
Little Earthlings
www.littleearthlings.com
Natural Collection
www.naturalcollection.com
See Saw
www.seesawnappies.co.uk
Smile Child
www.smilechild.co.uk

CLOTHING

Aravore
www.aravore-babies.co.uk
Baby Organics
www.babyorganics.co.uk
Bishopston Trading Company
www.bishopstontrading.co.uk
Gossypium
www.gossypium.co.uk
Huggababy
www.huggababy.co.uk
Natural Child
www.naturalchild.com
Schmidt Natural Clothing
www.naturalclothing.co.uk
Tatty Bumpkin
www.tattybumpkin.com

CLOTH NAPPIES

Sam I am
www.nappies.net
Snazzypants
www.snazzypants.co.uk
The Nappy Lady
www.thenappylady.co.uk

TOYS & GAMES

Arujo
www.arujo.co.uk
Dawson & Son Wooden Toys
www.dawson-and-son.com
Escor Toys
www.escortoys.com
Gaia Distribution
www.gaiadistribution.com
Holz Toys
www.holz-toys.co.uk
Lanka Kade
www.lankakade.co.uk
Myriad
www.myriadonline.co.uk
Toyworm
www.toyworm.co.uk
Tulip Toys
www.tuliptoys.co.uk

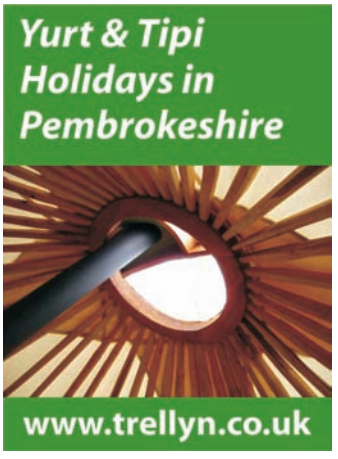
GIFTS

Tiny Sprout
www.tinysprout.co.uk

SKIN & BODYCARE

Burt's Bees
www.myburtsbees.co.uk
Earth Friendly Baby
www.earth-friendly-baby.co.uk
Earth Mama Angel Baby
www.earthmamaangelbaby.com
Earthbound
www.earthbound.co.uk
Weleda
www.weleda.co.uk

HOLIDAYS



WEDDINGS

DRESSES
Wholly Jo's
www.wholly-jo.co.uk
HONEYMOONS
Responsible Travel
www.responsibletravel.com
LISTS
Green Fibres
www.greenfibres.co.uk
RINGS
Cred Jewellery
www.cred.tv
Ethical Wedding Rings
www.silverchilli.com
VENUES AND CATERING
Fallow Fields
www.fallowfields.com

OFFICE RESOURCES

CARTRIDGES
Action Aid recycling
www.actionaidrecycling.org.uk
COFFEE AND TEA AND MILK
Fair-trade
www.fairtrade.org.uk
PAPER
Evolve
www.evolve-papers.com
STATIONARY
Ecotopia
www.ecotopia.co.uk
Remarkable
www.remarkable.co.uk
TELEPHONE & INTERNET
Green Isp
www.greenisp.net
The Phone Co-op
www.thephone.coop
WATER
Aquatic
www.aquaiduk.co.uk

PERSONALS

PROPERTY

WANTED:
Mature ns tenant. Shared country bungalow near Canterbury with land. Animals welcome. **£250 pcm. 01227 730625**

FUNERALS

COFFINS
Nigel's Eco Store
www.theinsightecostore.com
The Sawd Partnership
www.bamboocoffins.co.uk
Somerset Willow
www.somersetwillow.co.uk
FLOWERS
Green Fuse
www.greenfuse.co.uk
Red Hen
www.redhens.co.uk
FUNERAL SERVICES
Family Care Funeral Services
www.ecofunerals.co.uk
Natural Endings
www.naturalendings.co.uk
Natural Death Centre
www.naturaldeath.org.uk
Green Undertakings
www.greenundertakings.co.uk
Green Ending
www.greenendings.co.uk
Olney Green Burial Company
www.thegreenburialcompany.plc.uk
Peace Funerals
www.peacefunerals.co.uk
Woodland Burials
www.woodlandburials.co.uk
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SO FAR, SO GOOD

BY EDWARD GOLDSMITH

The experts assure us that current levels of lead in our air and water are safe. Scientific endeavour, it would appear, is something that confers on a proposition some measure of credibility – perhaps even downright certainty. If so, how is this achieved? The answer appears to be: on the basis of observations made during laboratory experiments.

A little reflection will reveal that such observations cannot provide any sort of certainty, and this for a number of reasons. Firstly, sensitivity to different pollutants will vary with every individual. Thus, to determine with certainty what are the effects of a pollutant, such as lead, on human health, everybody would have to be tested. As this is not remotely feasible, a first compromise is required: we must content ourselves with testing a sample of people, and we must assume that the sample is representative. This may be probable, but it cannot be certain.

However, people do not on the whole volunteer to be the object of laboratory experiments. This renders necessary a second compromise: non-human animals must be used instead of people, and we must make a second assumption; that people will be affected by a particular pollutant in the same way as are those animals - an assumption that forces us to make do with a still lower degree of probability. Of course, probability could be further increased by using animals as much like ourselves as possible, such as chimpanzees, but these are expensive and difficult to obtain. Hence there must be yet another form of compromise - experiments must be carried out on those mammals that are easily available, such as mice, still another compromise.

However, even mice cannot always be used. For in order to test the carcinogenic effect of a chemical, for instance, we would have to take into account that no more than one out of 500 people dies of cancer every year. If we regarded a 1 per cent increase of the cancer rate as tolerable, the acceptability of the chemical concerned could only be determined by testing it on a sample of 50,000 mice. This might be conceivable if only a few chemicals had to be tested; but the chemical industry is pouring approximately 1,000 new chemicals into our environment each year, and already something like 50,000 are in use, the testing of which would require tens of millions of mice!

Imagine the environmental impact of harbouring such a large number of mice in our laboratories. The sewage bill alone would be prohibitive. There is another reason why mice may not do: the biological effect of pollutants is not immediately apparent. Cancer usually develops in a human being some 20 to 40 years after exposure to a carcinogenic agent. Thus, such effects can only be fully determined over a number of generations of laboratory animals.

Dr. Bryn Bridges of the Medical Research Council Cell Mutation Unit, Sussex University, has found that hamster cells cultivated in vitro best satisfy these requirements. To argue from hamster cells to people, however, must involve a still further compromise. In addition, we have been assuming that chemicals and other pollutants will have the same effect on us in different combinations as when affecting us separately, so ignoring the very important synergistic effects. Thus the effect of cadmium is much greater on people suffering from a zinc deficiency.

The incidence of lung cancer among uranium miners who smoke has proved to be eight times higher than among non-smoking uranium miners. However, to test every possible combination and permutation of 50,000 different chemicals would require an astronomic number of white mice or a still greater number of hamster cells, at a totally prohibitive cost. Thus, regardless of the organism on which we choose to carry out our experiments, we are forced to make yet a further compromise: we must be satisfied with a very small sample of all the possible combinations, or, as the authorities do in the UK, simply ignore synergistic effects.

In addition, we are still assuming that the correlations observed in laboratories constitute bona fide cause-and-effect relationships. Thus, when we observe the presence of a pollutant and a particular biological effect, we assume that the former causes the latter, but it could, conceivably, be the other way round. Or both could be the result of a third factor, or a variety of other factors. Empirical correlations cannot by themselves constitute evidence, and it is about time our experts realised this.

Four thousand people died from the London smog of 1954 before the Clean Air Act was passed. What sort of disasters are required to provide us with the 'evidence' that current pollution levels are getting out of control? The fact that scientists are not at the moment being called upon to count the corpses is the only case they have for stating that present pollution levels are acceptable. Indeed, all that is implied by such statements is – so far, so good.

Ecologist editorial, October 1971

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