



SGR makes the case for an ethical science policy

Stuart Parkinson, Director of SGR, argues that the Government's proposed science investment strategy is fundamentally flawed, and describes SGR's recent efforts to present ethical alternatives

Over the past few months, through a combination of public lectures, articles and the submission of a key paper to Government, SGR has been making the case for major changes in UK policy on science and technology to make it more 'ethical'.

With the Government set to announce a ten-year investment strategy for science and innovation very soon, it has been a critical time to emphasise the importance of concerns such as peace, social justice and environmental sustainability.

A reading of the consultation paper on the ten-year strategy (issued in March) demonstrates how much change is needed. The Government's priority is to greatly expand business-university collaboration as a way of fuelling economic growth, with only limited attention being given to environmental and social priorities, and no reduction of the massive military science and technology budget.

In our submission to the consultation, we argued for fundamental changes to the strategy such as making the focus sustainable development rather than economic growth (see Science Policy, p4). In making our submission we drew support from Greenpeace's Chief Scientist, Genewatch and Architects and Engineers for Social Responsibility.

Many of our other activities have heightened awareness of the key issues that we raised in our submission. In public lectures and articles, SGR representatives have been highlighting problems such as the extent of corporate or military power within science and technology, or arguing for a more ethical perspective in general. Lectures have taken place at the Green Party's spring conference and university venues, while articles have appeared in, amongst others, Physics World.

But we will need to keep up the pressure. One important way will be through the publication of our report on 'Understanding the military influence on science, engineering and technology' due in the autumn (see Science Policy, p4). We are planning to hold seminars on this work at the Festival of Science in Exeter in September (see box above right), and the European Social Forum in London in October. Given also the continuing problems in Iraq, emphasising the shortcomings of heavy military involvement in science and technology could not be more timely!

<StuartP@sgr.org.uk>

WEAPONS TECHNOLOGY AND SCIENTIFIC ETHICS

A Public Discussion Meeting organised by the British Pugwash Group and Scientists for Global Responsibility at **The British Association 2004 Festival of Science, University of Exeter, 8th September 2004**

9.30-11.30am, **Pugwash Session: *Eliminating Weapons of Mass Destruction***

Speakers: Dr AWM Hay, Dr J Perry Robinson, Dr CJH Watson.

11.30-12.30pm, **SGR Session: *The Ethics of Military Science and Technology***

Speaker: Dr S Parkinson

For more details, see
<<http://www.sgr.org.uk/otheracts.html>>

Contents

News from SGR	2
Elsewhere in the News	8
Articles	
Pesticides to Permaculture	9
Science Aid	10
GM Maize	11
The GM Debate	12
Book Reviews	13
Letters	22
Events	24

News from SGR

A few words from the Director...

Stuart Parkinson

By the time you read this, Chancellor Gordon Brown will probably have announced the ten-year investment strategy for UK science and innovation. The signs are not good, as the front page article discusses. However, SGR's work in this area has expanded over recent months and we are now reaching much wider audiences with our criticisms and ideas for reform. This is especially important as few peace, environmental or social justice groups currently work in this area, while mainstream science and technology bodies are much more circumspect about ethical concerns than SGR. With the planned publication in the autumn of our report on **the military influence on science and technology** (see p4), we intend to reach an even greater audience.

SGR has also been busy elsewhere. We've published two more **ethical careers** briefings, spoken at or run stalls at 9 ethical careers events, and expanded the ethical careers web-pages (see p4).

On May 15th we held the annual **SGR conference** on 'From Greed to Need: Reshaping consumption and technology for a sustainable world'.

65 people attended (our highest attendance for some years), and feedback was very positive. The conference report will appear in the next newsletter. The discussions at the conference are feeding in to SGR's response to the current consultation on the UK Sustainable Development Strategy. SGR's AGM was also held that day, and a new National Coordinating Committee was elected (see p3).

One important piece of good news in the last few months was the announcement by Bayer CropScience that they had decided not to go ahead with commercial planting of the **GM maize**, Chardon LL, in the UK. SGR members may remember that this was the crop which SGR first presented evidence against at Government hearings as far back as 2000, so we are pleased to see it finally withdrawn (see p5 & p11). Its demise means that that no commercial plantings of GM crops will take place in the UK for the next few years.

Another piece of good news was the release of **Mordechai Vanunu**, the Israeli scientist who was imprisoned for 18 years after he blew the whistle on the existence of Israel's nuclear

weapons (see p8). On a sadder note, UK nuclear whistleblower **Ross Hesketh** has died aged 74 (see p8). Ross, a longstanding member of Scientists Against Nuclear Arms and SGR, exposed the clandestine export of plutonium produced in UK civil nuclear reactors for use in US nuclear weapons in the 1980's. We were also sad to hear of the death of another longstanding SGR supporter, **Joan Mason** (see p8).

One important recent development from an organisational point of view is that SGR has been approached by **Architects and Engineers for Social Responsibility (AESR)** with a view to forging much closer links (see p3). We would be very interested on any views members have about this possibility.

Finally, thanks to all of you that responded to our **membership survey** (see p7). Generally the feedback was very positive, with useful ideas for improving SGR's work which we intend to take forward over the coming months.

<StuartP@sgr.org.uk>

SGR Conference and AGM

Our 2004 Conference, '**From Need to Greed: Reshaping Consumption and Technology for a Sustainable World**', was held on 15th May in London.

A summary of the conference is available on the SGR website at <<http://www.sgr.org.uk/Conferences/2004Conf&AGMSummary.html>>

A full report will appear in the next newsletter. A report of the AGM appears on p3.

SGR Annual General Meeting

Patrick Nicholson

The SGR AGM took place in London on 15th May as part of the SGR conference. The AGM summary is given here, with a full conference report following in the next issue of the newsletter.

Stuart Parkinson, Director of SGR, began the AGM by summarising the Annual Report. In this past year SGR has steadily increased its activity as part of a 2 year development plan aimed at increasing membership and income. The year saw the appointment of SGR's first Director (Stuart himself), and also a part time researcher, Chris Langley. SGR has now published five Ethical Careers briefings, and around 7000 copies of the careers material have been distributed, of which approximately two thirds has been via the web. Our website now attracts about 1500 hits each week. We have achieved some notable media successes, including coverage in the broadsheets and an article in Physics World. Our project on vested interests and the corporate

influence in science continues to move forward, driven by valuable voluntary work. SGR has continued to lobby, for instance on the Iraq war and GM issues, and has responded to calls for consultations, most recently on the UK Government's 10 year Science Plan. We gained 70 new members last year, more than in any previous year, but this was still lower than we'd hoped to achieve. We've had some setbacks in funding applications, with only a success rate of 1 in 10, but, on the plus side, donations from members have been high.

Chris Langley gave an update on the Military Influence project (see p4). Most of the final report has been drafted, and it should be published later this year. Chris summarised some key findings, and also noted that there had already been media interest in the project.

The minutes of the last AGM and the current Annual Report were then

approved. Elections followed, and all those standing were elected unanimously. They were as follows: Chair: **Philip Webber**; Treasurer: **Jenny Nelson**; Secretary: **Tim Foxon**; Committee Members: **Alan Cottey, Patricia Hughes, Patrick Nicholson, Eva Novotny, Vanessa Spedding**.

Stuart then introduced Kate Macintosh from Architects and Engineers for Social Responsibility (see p2), who gave a summary of AESR's history, and outlined its present position and activities. Kate's presentation led into a discussion of the issues involved in AESR and SGR becoming more closely linked. Points raised included the challenge of bringing together diverse groups without anyone feeling sidelined, and the potential benefits for AESR from SGR's higher public profile and larger membership.

<PatrickN@sgr.org.uk>

Closer links with Architects and Engineers for Social Responsibility (AESR)

Phil Webber and Stuart Parkinson

SGR has recently been approached by Architects and Engineers for Social Responsibility (AESR) with a view to forging much closer links, and possibly even merging with us.

AESR was formed about the same time as SGR, and has many similar aims and objectives. Both memberships have identified nuclear arms, disarmament and climate change, and sustainable development as key areas of interest for example.

AESR's membership is less than half the size of SGR's and its income is also rather lower. However, working more closely together could potentially increase the influence - for example through influencing professional institutions better - and improve the financial viability of both organisations.

With this in mind we invited AESR's Chair, Kate Macintosh, to come and

speak at the SGR AGM in mid-May (see above). Comments by SGR members and some AESR members who were present were generally supportive of much closer links between the two organisations. In mid-June we held a meeting between SGR and AESR committee members to discuss the next steps in closer collaboration. In the first instance we have decided to merge our respective newsletters from the next issue. Patrick Nicholson, SGR newsletter editor, will edit the combined newsletter. Discussions on other areas of collaboration - for example the website - are continuing. We are particularly keen to build on the professional strengths of both organisations.

Key points that have emerged from these initial discussions are that with a broader spread of interests it will be important to highlight the constituent

parts of AESR and SGR to a greater degree enabling different professions (engineers, social scientists, natural scientists, architects, IT professionals, science educators etc.) to identify with and be better represented by a common organisation. For example in SGR we have been talking about developing a specific psychologists group and working out arrangements for Student SGR groups that wish to form. There certainly could be significant areas of benefit for joint working - for example AESR have produced briefing material that complements the SGR careers series.

We would be very interested in any views members have about close collaboration with AESR and the possibility of an eventual merger.

<StuartP@sgr.org.uk>

Thinking About an Ethical Career in Science and Technology

Vanessa Spedding and Stuart Parkinson

The past few months have again been a busy time for the ethical careers project, with the publication of new briefings, more talks and stalls at ethical careers fairs, more media coverage, and an expansion of the material on the website.

Two new ethical careers briefings have been published since the last newsletter meaning there are now five briefings available. The fourth briefing 'Your career and sustainable development' by Phil Webber (SGR Chair) was published at the end of November, while the fifth briefing 'Unscrambling a space career from military forces' by Dave Webb (Leeds Metropolitan University) was published in late April. Both have initially been published only in electronic form downloadable from the SGR web-site <<http://www.sgr.org.uk/ethics.html>>, but thanks to a grant from the Scurrah Wainwright

Charity we will shortly be bringing out printed versions.

We have also been busy giving talks and running stalls at university ethical careers fairs and other similar events around the country. During the autumn and spring terms we gave 5 talks (at university venues in Lancaster, Cambridge, Nottingham, Sussex and London) and had a presence at 7 ethical careers fairs. The interest from students was generally very positive, especially because science and technology stalls are rare at such events. Thanks to the many SGR volunteers without whose help we could not have covered so many events.

Media coverage, often prompted by the release of the new briefings or tied in with a careers fair, has continued to be very positive. We wrote a full page article for April's edition of the Institute of Physics magazine,

'Physics World', and featured in articles on ethical careers in the Daily Telegraph and The Independent, as well as other mentions in green and science press.

The ethical careers web-pages have also been expanded and now include a 'List of Ethical Employers', and more articles and links on this topic.

All this work is paying off. Demand for the ethical careers publications continues to be high. We've now distributed a total of nearly 3000 copies of the five briefings, both electronically and on paper. In addition, 4000 copies of our 32-page introductory booklet have now been distributed. We also have hundreds of visitors to the ethical careers web-pages each month, with the new ethical employers page proving especially popular.

<StuartP@sgr.org.uk>

Science Policy

Stuart Parkinson

SGR's science policy work has continued to expand over recent months, including lobbying on the proposed ten-year UK science strategy, further research on military influences, and a range of talks and lectures.

In March, the Government published its consultation paper, 'Science and innovation: working towards a ten-year investment framework'. SGR put together a critical response arguing that:

(i) sustainable development rather than economic growth should be the driving force behind applied science and innovation;

(ii) the proposed large-scale expansion of business-university partnerships is likely to undermine both the independence and integrity of academia, and hence be detrimental to society and the environment; and

(iii) there should be a major shift of funding from military science and

technology to civilian areas which support sustainable development, conflict prevention etc.

The full response can be found on the SGR web-site at <http://www.sgr.org.uk/SciencePolicy/Resp_10yrstrategy_apr04.htm>.

Our research project 'Understanding the military influence on science, engineering and technology' continues to make very good progress. Our researcher, Chris Langley, has most of the report now in draft form, including details of various collaborative ventures between the military, industry and universities, the powerful role of various military lobby groups, and case studies of military science and technology including the expansion of Aldermaston nuclear weapons laboratory. We plan to have a final draft ready by the end of July.

We have also given several talks and lectures in the last few months to

audiences including scientists, students, activists and the public. On the subject of military influence on science, Chris Langley spoke at Imperial College, and I gave presentations at the Green Party spring conference (Brighton) and Lancaster University. On the subject of corporate influence on science, Jon Goulding spoke at Café Scientifique in Nottingham, while I gave a second presentation at the Green Party conference on this subject. In addition, one of the workshops at the SGR conference focused on science and technology policy and its role in contributing to sustainable development. We also had a three-page article entitled 'Can science funded by industry be ethical?' in the members' magazine of the Chartered Institution of Water and Environmental Management.

<StuartP@sgr.org.uk>

GM Issues

Eva Novotny

During the latter half of 2003, we placed a collection of six articles on the SGR website to describe the failures and potential dangers of planting genetically modified crops. We sent a letter to two members of the European Parliament concerning 'GM Contamination and Organic Agriculture'. In response to the Government's GM Science Panel First Report, we sent a reply to point out various factors that had apparently not been taken into account when separation distances were set to prevent cross-pollination by GM crops. An Annex to our reply, which presented a new method for calculating these distances, confirmed that these factors had not been included in the accepted separation distances. In November, we published an article on the Comments and Analysis page of The Guardian, in reply to a letter from 114 biotechnology scientists. We also

lobbied for the initialisation of a Bill on Contamination and Liability.

In 2004, I joined the panel in a Briefing for the London Assembly and spoke about 'Winners and Losers in the GM Debate'. Our warnings about the spread of pollen were corroborated when a rare blue maize was grown in Illinois and was found to have contaminated maize up to 3 miles away. This fact was conveyed to the Environment Secretary Margaret Beckett and others shortly before the Government reached its decision on the commercial planting of GM crops in the United Kingdom. The decision was to approve the maize Chardon LL; but the seed developer subsequently withdrew it. We placed an article describing some of the details of this decision on the GM web page, and this article also appears on p11 of this issue of the SGR newsletter.

We sent a letter to several EU Commissioners, including Margot Wallstrom, about the GMO Seed Directive, urging that the accepted threshold levels of seed contamination be set as low as can be detected. We contributed to a Parliamentary Committee consultation on the 'GM Maize Planting Regime' and submitted comments on an assessment of Monsanto's maize NK603 x MON810, which contains genes not only for herbicide tolerance but also for the production of Bt toxins against certain pests. We also made a submission to the European Food Standards Authority on their guidance for risk assessment, as well as participating in the first two of DEFRA's Sustainable Farming and Food Research Priorities Group Stakeholder Workshops and attending various conferences.

<EvaN@sgr.org.uk>

Arms and Arms Control

Phil Webber

In the media the focus has been almost entirely upon "the war on terror", although interestingly, the fairly establishment International Institute for Strategic Studies in London (IISS) came out with a report in the spring which concluded that one of the main planks of this so-called war - the invasion and occupation of Iraq - had actually increased the number of terrorists and created real links between Iraq and terrorism where none had existed before.

Largely unreported were the several developments in Missile Defence (MD). Various tests are still planned in the US ranges, and secret discussions are taking place about possible sites for anti-missile systems in Europe and other locations. One cannot help wondering if it is possible that at some time in the future the UK Government will again host anti-missile missiles (some were originally deployed in the 1950's). If this were

to happen this would be a much more tangible focus for dissent which currently is focussed around sites such as Menwith Hill and the Fylingdales radars in Yorkshire.

SGR's main activity in relation to the military is the research project 'Understanding the military influence on science, engineering and technology', which is covered in the Science Policy section on p4, but we have also undertaken a few other activities recently.

BASIC - the British American Security Information Centre - organised a seminar on missile defence at Bradford University's Dept. of Peace Studies and invited as wide a range of participants as could be persuaded to attend from both sides of the MD "fence". Dave Webb and I were both invited to give talks. Dave covered the many technical arguments against MD whilst I covered some of the strategic implications. These talks can be downloaded via a link on the

SGR website <<http://www.sgr.org.uk/arms.html>>.

SGR was invited to take part in the march and demonstration against the expansion of the Atomic Weapons Establishment (AWE) at Aldermaston over the Easter weekend. The AWE is actively recruiting scientists and engineers, as they expand their supercomputing facilities, build a new hydrodynamics laboratory (for research on explosives) and build a new high energy laser facility. The expansion will allow the UK to bypass the international restrictions on nuclear weapons testing, and could be used to develop the next generation of nuclear weapons. Stuart Parkinson represented us at this event. A very important related issue is the update of the US-UK agreement on nuclear weapons and a decision to upgrade the Trident missile and warhead system. An interesting note from the Bradford seminar was that the UK has apparently a very high technical

ability in warhead fabrication and design (at present) following from the Polaris-Chevaline MIRV (multiple independently-targetable re-entry vehicle) warhead system which is also very relevant for anti-missile defence system design.

As mentioned above, Dave Webb wrote a briefing for our ethical careers project entitled 'Unscrambling a space career from military forces' which, as we go to press, has been reported in *Physics World* and *Science and Public Affairs*. Careers in space are a very

topical issue with the next generation of planetary system probes raising the profile of space exploration in the media. We also took the opportunity to put out a press release on proposals for a manned mission to Mars announced by President Bush. Our take on this was picked up by the media as it was somewhat unusual - scientists pointing out how the (likely) hundreds of billions of dollars needed for a manned mission could be used instead to combat global warming or poverty. Channel 4 News even spent

an afternoon filming me and doing an interview - but as so often happens the piece was never used as more conventional Mars angles and domestic agendas crowded out the slender media window.

Once again - if there are any members out there who want to help on arms issues (or set of issues) please get in touch.

<PhilW@sgr.org.uk>

Climate Change and Energy

Stuart Parkinson

More evidence has recently emerged of serious climate change in the Arctic. NASA has released temperature data based on satellite measurements which indicate that the Arctic has warmed eight times as much in the last 20 years as over the past century [1]. Are world leaders stepping up their efforts to tackle climate change as a result? Well, at least one seems to have taken a small forward step. Russia's President Putin announced in May that he will "speed up Russia's movement toward the Kyoto Protocol's ratification" [2]. Although it seems that this is more a result of the EU declaring its support for Russia's application to join the World Trade Organisation than concern about the environment, it is important as, without Russia, the Kyoto Protocol cannot come into legal force. Meanwhile Tony Blair has said he will make climate change a priority issue at the next G8 summit - whether this will shift US policy remains to be seen.

One rather less welcome consequence of the growing evidence of damage due to climate change is that it has led Professor James Lovelock (originator of the Gaia hypothesis) to give very public support for a massive expansion in nuclear power to tackle the problem. The Independent newspaper decided to run this story in May with a front-page headline, 'Only nuclear power can now halt global warming'. SGR responded with a letter, published on 26th May [3], arguing that, not only does nuclear power have too many inherent problems of its own, but that if we were to shift much of the huge resources currently focussed on military activities and technologies to (e.g.) renewable energy and energy conservation, then the large-scale cuts needed in greenhouse gas emissions would be within reach.

At the SGR conference, Tim Foxon ran a workshop focusing on 'Overcoming the barriers to sustainable energy use'. The

discussions at this workshop will contribute to SGR's response to the Government's consultation on its Sustainable Development Strategy.

Finally, the ethical careers briefings 'Career choice and climate change' and 'Cleaner technologies: a positive choice' continue to be popular, with a total of 1500 copies of the two now having been distributed (see p4).

<StuartP@sgr.org.uk>

References

- [1] New Scientist (2003) Satellite data reveals rapid Arctic warming. 24th October.
<http://www.newscientist.com/hottopics/climate/climate.jsp?id=ns99994310>
- [2] BBC online (2004) Putin U-turn could rescue Kyoto. 21st May.
<http://news.bbc.co.uk/1/hi/world/europe/3734205.stm>
- [3] SGR (2004) New energy sources to save the planet.
<http://argument.independent.co.uk/letters/story.jsp?story=524864>

SGR membership survey 2003/04

Stuart Parkinson

In the last newsletter we enclosed a questionnaire for members to fill in to give feedback to the National Coordinating Committee (NCC) on the organisation's activities. The questions asked for views on virtually all SGR's work: issues of concern; ethical careers; SGR conferences; research projects; newsletter;

publications; web-site; email-lists; media work; and SGR as a support network. We're very grateful to the 51 members who replied (a little under a tenth of the membership). This is what was said...

Issues of concern (including lobbying)

Of the main issues that SGR focuses on, the ones which respondents felt were the most important were Arms and arms control, Climate change and energy, and Science policy. Roughly 75% of respondents rated these at

least 7 out of 10. Population, consumption and values and Genetic modification were considered less important with only 62% and 56% respectively rating these at least 7 out of 10. In terms of lobbying, we currently carry out less work on Climate change and energy issues mainly due to a lack of volunteers in this area. If any readers are interested in helping to boost our climate change lobbying, e.g. assisting in responding to Government consultations in this area, please email me at <StuartP@sgr.org.uk>

Ethical careers

The ethical careers work received a lot of praise echoing the feedback from non-members. Many respondents had read some of the publications (despite many being above the age at which this material is useful to them!), or had passed them on to family or friends.

SGR conferences

Not many respondents had been to an SGR conference recently, citing reasons such as distance, infirmity, work commitments and subject matter. Subject matter was cited as the main deciding factor in coming to conference. Being an organisation which covers such a diverse range of issues, it is often difficult to find subjects which appeal to all or even most SGR members and this was confirmed by the wide range of suggestions made by respondents for future conference topics. However, we are looking into ways to give the conference broader appeal. Still, having just had our highest attendance at a conference for several years, I don't think we're doing too badly! In terms of format, a one-day event in London (as we currently do) was

easily the most preferred.

Research projects

Respondents were generally very supportive of our ongoing research projects, 'Understanding the military influence on science, engineering and technology' and 'The role of vested interests in science and technology'. There were also a few ideas for further research work.

Newsletter

There were a lot of compliments for the newsletter. 80% said the content was good or excellent; while 58% felt the presentation was good or excellent. There were several suggestions for improvements to the presentation, e.g. more pictures/diagrams/cartoons and larger typeface/more spaced text. We are planning improvements to the presentation for the next newsletter, and so will incorporate these suggestions. There were also a lot of suggestions for a name for the newsletter - the NCC is still discussing which to take up...

Other publications

Only a handful of respondents had read any of SGR's recent publications (apart from the ethical careers booklet and briefings). One reason is that some of them have only appeared on the web-site. In response, we have decided to start printing a full list of recent publications (with details of how to get them either electronically or on paper) in the newsletter (see p23).

Website

One clear message from the survey was that members are infrequent visitors to the SGR website. Only a quarter of respondents had visited the

website, and most, while generally happy with the content and presentation, had only visited a small number of times. This is disappointing as the website is one of our most valuable resources with a wealth of material available, and is clearly very popular with non-members with about 1500 visitors to the website per week! Because of the low percentage of SGR members who visit the website, we have decided to publicise new material and publications in the newsletter (see p23) so that members are able to see what's available more easily.

Email-lists

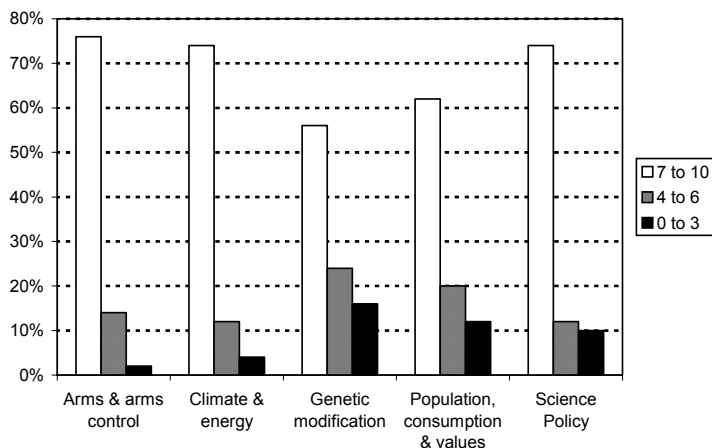
About 100 SGR members are on the main email-list, 'sgrforum'. Amongst other things, the NCC and staff use the email-list to keep members more closely informed about SGR activities. Members also use the list for circulating useful information, or for occasional discussion. Those on sgrforum that responded to the survey were happy with the content and frequency of emails on the list (on average one per day). Respondents not on sgrforum cited reasons such as 'get too many emails already' for why they had not joined. Instructions for joining sgrforum can be found on p24. Few respondents knew of SGR's other email-list on Population, Consumption and Values. For more info, or to join this list, please contact Alan Cottey at <AlanC@sgr.org.uk>

Media work

SGR is still in the early stages of expanding its media work, so it is not that surprising that only a few people had seen SGR in the media, despite our recent successes in this area. The survey responses gave useful information of the reading preferences of those sympathetic to an SGR agenda!

SGR as a support network

One aspect we would like to develop further is SGR's role as a support network, e.g. in helping members contact and meet other like-minded scientists and technologists. It's clear that some (1 in 5) have already found SGR to be useful in this respect. Others have found it supportive in a more general sense, exemplified by comments like: 'Good to know other like-minded scientists are out there'.



Two networking opportunities members currently use are the email-list 'sgrforum' and our annual conference (see above).

Volunteers

About 30 people (60%) volunteered to help with one or more SGR activities

which is also very gratifying. (We are still in the process of following these all up.)

Overall, the responses were very positive with members being generally pleased with what SGR is doing. We are obviously very pleased

about this! The survey also generated useful information about where and how we can improve, as well as yielding many new volunteers.

Stuart Parkinson is Director of SGR

Ross Hesketh: 1929 - 2004

Patrick Nicholson

Ross Hesketh, nuclear whistleblower and a longstanding member of Scientists Against Nuclear Arms and SGR, has died aged 74.

Ross was born in Derbyshire and studied physics at Durham University, obtaining his PhD in 1954. After two years with the British Antarctic Survey, he returned to take up post-doctoral studies at Glasgow University. He subsequently joined the CEBG, working mainly in the field of nuclear fuels. In 1981, Ross wrote a historic letter that ultimately led to his being sacked by the CEBG.

His letter pointed out that sale of UK plutonium to the Reagan Administration would make nonsense of the supposed distinction between civil and military use of fissile material. He set off to investigate and publicise the truth behind UK plutonium stocks and its destination in the US. His sacking in 1983 left him free to contribute to the 1984 Sizewell public inquiry, demonstrating with near-certainty that plutonium from UK Magnox reactors had ended up in the US military stockpile. Ross went on to become Director of the

European Proliferation Information Centre, Professor of Physics and Dean of the Science Faculty at Bayero University, Kano, Nigeria, and retired in 1991.

In retirement he continued to work actively on nuclear issues, through the Pugwash Conferences on Science and World Affairs, and also through his membership of SGR and his regular contributions to the SGR newsletter.

<PatrickN@sgr.org.uk>

Joan Mason: 1923 - 2004

Patrick Nicholson

Joan Mason, a member and consistent supporter of SANA/SGR over many years, died recently. She was a pioneering chemist who fought the cause for women in science.

Joan studied Natural Sciences at Cambridge, undertook doctoral studies at the Atomic Energy Commission, post-doctoral studies in the USA, and obtained an assistant

lectureship at University College London in 1955. Following a career break to bring up a family, she worked on nuclear magnetic resonance spectroscopy at the University of East Anglia, and obtained a lectureship at the Open University in 1970, and retired, as reader, in 1988. She then redirected her attention to historical studies on

the achievements of women scientists. In the mid-1990s she was responsible for setting up the Association for Women in Science and Engineering (Awise), which she chaired until her death. She received the MBE in 2003 for services to women in science.

<PatrickN@sgr.org.uk>

Elsewhere in the News

Vanunu released!

Mordechai Vanunu finally walked free from prison on April 21 after spending 18 years in jail for revealing secrets that exposed Israel as one of the world's top nuclear powers and said he was "proud and happy" at his actions. Mr Vanunu leaked details and pictures of Israel's alleged nuclear weapons program to the Sunday Times in 1986. Based on his account, experts said at the time that Israel had

the world's sixth-largest stockpile of nuclear weapons. The revelations undercut Israel's long-standing policy of neither confirming nor denying its nuclear capability.

Guardian 21/4/04

New generation of nuclear submarines

According to The Scotsman, Royal Navy experts are preparing secret designs for a new generation of multi-

purpose nuclear submarines to replace Britain's Trident fleet. The plan aims to give ministers the chance to accelerate work on the Trident's successor immediately after the next election, to allow replacement of the existing fleet of ballistic-missile-firing submarines by around 2020.

Scotsman, 9/6/04

Summaries by Patrick Nicholson
<PatrickN@sgr.org.uk>

From Pesticides to Permaculture: Journey of a Plant Pathologist

Caroline Smith recounts a career path that took her to the other side of the world and a new perspective on the role of science

Introduction

This is the story of a personal journey about a conflict between a love for nature and a profession that declared war on her, and the slow relearning that emerged through the practices of permaculture and of organic farming. This journey has been a long one and began in early childhood in England, nurtured by my mother who loved the English countryside with a passion. At school I felt no conflict between my love for nature and my favourite subject at school - science, which added to my understanding of the natural world. I studied chemistry and microbiology at Bedford College, University of London, then went on to spend a year at Imperial College's Silwood Park studying for a Masters degree in mycology and plant pathology.

Being a Plant Pathologist

The choice of plant pathology seemed a good one – it would satisfy my love of science and my need to work outdoors. I had dreams of being an agricultural research scientist. During this time my parents emigrated to South Africa, and having vowed I would never set foot in the place, I arrived there 'just for a holiday' in 1970. The holiday lasted 13 years. My first role as a real scientist was as a plant pathologist in the South African Department of Agriculture. My job was to identify fungal pathogens of crops such as lucerne and chicory, and then find out the best highly toxic fungicide, kindly supplied by a couple of major chemical corporations, to eliminate them. In my work I uncritically adopted the only means I knew - the methodology of reductionist science, well learned through my formal education. This approach took no account of the larger system in which the host-disease relationship was played out. I never even considered looking at the system as a whole, and question why these diseases existed. I had not been trained to think systemically or holistically. And so I never even considered whether other means of

fungus control could be possible. The process was simply to isolate the pathogen, select a fungicide effective *in vitro*, then carry out suitably designed trials after which the farmer could be reliably recommended which chemical to spray on the infected crop. And I, a naive 23 year old from London with a fancy Master's degree, but who had never planted a bean in her life, was the one to hand out the advice. The wider implications of such pesticide use or even the cost to the hapless farmer simply did not enter my thinking. I was the expert, the specialist, the source of knowledge. I had joined what Vandana Shiva (1989) described so perfectly - a new breed of agricultural 'experts' who have fragmented knowledge of individual components of the farm system, but who through their work have become totally integrated with the market system of the chemical companies. I still remember the systemic fungicide benomyl (benlate) being heavily pushed as the saviour of cucurbit growers. Benlate has since been associated with birth defects and has been withdrawn. And though we may no longer use some of the very toxic pesticides of those days, the push for GMOs in agriculture displays the same reductionist mindset.

It was only by chance that I stumbled across another approach. I heard somewhere that by simply altering the fertiliser regime, some fungal pathogens were rendered less destructive. This insight refused to go away. It represented the dawning of a different way to approach plant disease, and in hindsight proved to be the beginning of the slow unfolding of what I now understand as a new ecological paradigm. Something deep down, instinct, call it what you will – began to gnaw at me, and the agricultural research I was conducting and its underlying assumptions became less and less attractive. I believe that at a deep level I was slowly realising that my love for nature deeply contradicted the way in which I had been trained and was

being asked to operate. I left agriculture and entered the world of education. It was only much later that I was able to understand clearly the way in which chemical agriculture operated and how I as a scientist had been unwittingly co-opted into this system of war on nature.

Discovering permaculture

I first came across two remarkable texts in early 1980's called Permaculture One (Mollison and Holmgren, 1978) and Permaculture Two (Mollison, 1979). It was a moment of epiphany - a mere flick through the pages sparked a recognition, a resonance, a sense of sanity; what Mollison has called "uncommon sense". It seemed to be pointing to the kinds of answers to questions I was unconsciously grappling with ever since those agricultural research days. Permaculture talked of human scale living through the creation of sustainable human settlement, of recognising humans as part of larger natural systems, of working with nature instead of against her, of care for the earth and care for people. Permaculture was asking humans to take personal responsibility for our impact on the environment. Its principles seemed particularly sane and workable when viewed alongside the ever-deepening environmental crisis. Instead it offered an ecological vision towards a quality of life in ways that did not depend on the destruction of nature. And most appealingly, permaculture was implicitly action orientated, enabling positive, achievable solutions and directions forward.

The seeds of change had been sown. I began experimenting with vegetable growing in the back yard, often with disastrous results. The key design concepts of paying attention to sun, wind, seasons and soil were missing completely from these early efforts. My proudly acquired degrees and years in research proved useless in the face of carrots that failed to thrive, cabbages that were devastated by

caterpillars and compost that refused to break down. The agricultural scientist couldn't even grow a pumpkin! Later the family moved to a small block of land and I participated in a ten-day Permaculture Design Certificate course. Now the serious learning had begun.

Learning through inhabiting

In the years that followed, enactment of permaculture through design and intimately working on the land has enabled a growing consciousness of a sense of participation with rather than power over nature. It is an intimacy, an inhabiting rather than an occupying of the land. Through seeing the farm as a living system, I experience intense and powerful feelings of connectedness with nature that I never did as a plant pathologist. It is a spiritual connection. I'm beginning to know the wind and its changes, where water flows and where frost forms its patterns. Finally real meaning is given to the sterile classroom learning of geography and biology, of physics and chemistry as we attempt to develop a dynamic, interconnected, complex and sustainable system evolving over time and space where energy and resources are used as effectively and productively as possible.

Such long and protracted engagement brings forth the sense of place. There are no short cuts here. The sense of place means a far more intimate knowledge of where we physically live. I discover the exquisite and subtle world of myriads of insects and other small life forms and note with



Apples in February, Applemint organic farm, Australia

pleasure the appearance of a new species of bird as biodiversity increases. I am learning to recognise the subtle seasonal changes, the natural indicators. The lemon verbena in its first pale green scented leaves of late spring is a signal to plant the tender crops while the cry of the currawongs as they return from the mountains signals the return of winter.

Weeds take on new meaning, they are great teachers. They indicate wet and dry places, the low pH of the soil, the lack of minerals. They are the signs of our past failure to inhabit the land. They are marvellous sources of biomass, they become the black gold of compost, of mulch, even food. They provide nectar for insects, seeds for birds, cover for the earth that humans have made naked. And if we are content to wait long enough, they may prepare the way for native species as natural succession unfolds.

Recently David Holmgren has published an important new book on the principles of permaculture, which builds on 25 years of praxis (Holmgren, 2002). In it he notes that

“spiritual beliefs about a higher purpose in nature have been universal and defining features of all cultures before scientific rationalism. We ignore this aspect of sustainable cultures at our peril” (p.2).

So this scientist has come a long way. But the science learned in those far off days is not wasted, rather it is seen for what it is - a cultural knowledge that is one way of knowing, of making meaning. It is powerful knowledge but it is partial knowledge. And it is knowledge that is produced not in an objective, value free way but shaped by prevailing economic, political and social forces. So there really is no conflict at all. As scientists we are able to choose to produce knowledge for good – for a sustainable and socially just future, rather than for the profits of multinationals or the power politics of governments. We do indeed have a global responsibility.

Dr. Caroline Smith is a Senior Lecturer in Science and Sustainable Futures Education at the Australian Catholic University, Fitzroy.

References

- Holmgren, D. (2002). *Permaculture: principles and pathways beyond sustainability*. Hepburn: Holmgren Design Services.
- Mollison, B. (1979). *Permaculture two*. Tyalgum: Tagari.
- Mollison, B. and Holmgren, D. (1978). *Permaculture one*. Tyalgum: Tagari.
- Shiva, V. (1989). *Staying alive*. London: Zed Books.

Science Aid ... linking communities and scientists

Mandy Meikle describes a novel initiative aimed at bringing scientists into community projects.

ScienceAid is a 6-month pilot study, which began in January 2004. The project is run by the Centre for Human Ecology (CHE) in Edinburgh, in partnership with Friends of the Earth Scotland and with the support of SGR. The aim is to link communities who are campaigning against environmental injustices with a pool of scientists who are able to offer help and advice, ideally free of charge.

Such a resource would be invaluable to both urban and rural communities

facing environmental injustice - from polluting industrial plants and coastal fish farms, to waste management and extractive developments. Having access to free, reliable, scientific advice would enable people to engage much more effectively in local decision making.

Making links

We are looking to make contact with qualified scientists who might be interested in becoming involved with this project. While the community

projects would be based in Scotland, many people already receive help from remote experts and we would like to connect with academics across the UK to explore the options. Whether you are a biochemist, biophysicist, epidemiologist, microbiologist, physicist, medic, marine biologist or environmental scientist, if you have some relevant expertise and a little time to offer please get in touch.

Seminar

A one-day seminar was held in Edinburgh on Wednesday 2nd June to discuss the issues surrounding ScienceAid. Speakers explored the need for legitimacy in public science, looked at how communities already engage with science to protect their environments and at how communities might affect public

policy. Community activists described their work on fishfarm monitoring in the Highlands and campaigns across Fife against the powerful new TETRA radio-masts. Scottish academics reported their experiences of working with community groups. And there was an afternoon of discussions and participation to determine how best to stimulate the connections between science and local communities.

Mandy Meikle

For more information about the project, please email scienceaid@che.ac.uk or call Mandy Meikle on 0131 624 1973 (Monday & Tuesday only). You can also visit <www.che.ac.uk> to find out more.

The Decision on Commercial Growing of GM Maize

Eva Novotny outlines objections to the Government's decision to approve *Chardon LL* GM maize

The long saga of the first genetically-modified crop that was intended to be placed on the National Seed List has at last reached a conclusion. Margaret Beckett, Secretary of State for the Environment, Food and Rural Affairs, announced in March that the Government was granting approval for the commercial growing of the GM fodder maize *Chardon LL* in the United Kingdom, but with certain conditions. Less than a month later, the company that developed the seed, Bayer CropScience (formerly Aventis) withdrew it on the grounds that, by the time all the legislation pertaining to the conditions was in place, the seeds would no longer be economically viable.

Why the Government gave its approval is not at all clear. The GM Science Review and the Economics Review identified as many uncertainties and risks as possible benefits, while the public debate 'GM Nation?' and a MORI poll both showed that many more people oppose eating GM food than favour it. The only basis for approval seems to be that the Farm-Scale Evaluations (FSEs) showed a positive outcome for GM maize, in that the chemical management of that crop was less damaging to wildlife than that of the non-GM crop. The FSEs for maize, however, were invalid. The lesser damage to wildlife resulted from the spraying of the non-GM maize with the herbicide atrazine, which is so toxic that it has recently been banned by the EU, although the ban is not yet in force. To compensate partly for this complication in the assessment, resort has been made to the older National List Trials; but at least some of those trials used atrazine on the maize.

Comparison with the National List Trials suggests a lower benefit for wildlife than that apparent in the FSEs.

A future problem is already on the horizon, and this is the experience over several years of growing this variety in the United States. It is found that, after the first few years, the intended herbicide *Liberty* used on the GM maize can no longer control weeds; and atrazine is now being added to *Liberty* in the United States.

Another problem is that the distinguishing feature of the GM maize is the insertion of a gene to induce tolerance of the herbicide *Liberty*, based on glufosinate; but this herbicide has not, to date, been granted consent for commercial agriculture. Glufosinate is known to cause birth defects in mammals [1] and is harmful to marine life [2]. An Emeritus Professor of Medicinal Chemistry has warned that 'far-reaching and long-term consequences' would result from the interaction of glufosinate in the human body [3].

New varieties of seeds are legally required to show Value for Cultivation and Use. Yet the FSEs demonstrated that, under the cultivation procedures used in those trials, the yield of the GM maize was markedly lower than that of the conventional maize. This was not officially recorded because of the extremely narrow remit of the trials – hence it has apparently been ignored. Another fact not officially recorded and apparently ignored is that its late-maturing characteristic makes it unsuitable for growing in most parts of the United Kingdom. A farmer who grew it in the FSEs for three

years said that it never ripened and that "It will only ripen here one year in ten" [4].

Cross-contamination of non-GM varieties, by various means, is certain to occur. Theoretical predictions of how far maize pollen can be carried by the wind must be regarded as highly uncertain [5]. Recently, it has come to light [6] that three farmers in the United States found their maize contaminated by pollen from a rare blue variety planted on a farm as far as three miles away, in a direction crossways to the direction of the prevailing wind; yet the largest recommended separation distance is 200m. An American seed company requires that its seed growers must not lie within five miles of any GM maize field [7]. Conventional maize and organic maize in this country would therefore be under threat. Even gardeners who delight in home-grown maize would have to check whether GM maize is growing within several miles of their land.

The results of one more study should be seen before a decision is made to approve this forage maize. In 2002, the developer of the GM maize seed (Aventis/Bayer CropScience) announced that, in response to reports of animals refusing to eat GM crops or of losing weight if offered no choice, a feeding study on cattle was being undertaken. Only a one-page brief about this study is now available, prior to peer review. This brief does not mention whether the willingness of cows to eat GM maize has been tested, or whether they maintain their weight if they do eat it. The study concludes that 'nutritional value' and the yield and composition

of milk are comparable for the GM and non-GM silage. Even favourable results in this experiment, however, do not obviate the need for more research to assess the long-term effects of GM crops and foods. It is known that these may take years, and even generations, to become apparent [8].

The recent statement from the British Medical Association [9] is not as supportive of GM crops and foods as was suggested by media reports. The statement declares that '... the evidence for real benefit [of GM crops] is not yet sufficiently persuasive to grow GM crops at the expense of conventionally derived alternatives that can be grown at least as effectively' and concludes that the BMA 'does not feel that the argument has yet been made to allow widespread commercial planting of GM crops in this country.'

An economic aspect to consider is that the technology is very expensive and is absorbing large amounts of public money on research and monitoring. Case-by-case assessment for approval of each new crop has been recommended. After approval is granted, even more funds will be needed if the recommended post-surveillance monitoring is carried out to see whether there are any adverse effects on human health or the environment. If there prove to be such, as many fear, further public funds will doubtless be used in the attempt to counter those effects and their legal consequences.

Legal consequences have not yet been dealt with by the government. As yet

there is no law to assign liability for damage caused by GM crops. Margaret Beckett said that such laws need to be in place before the GM maize can be planted next year. The GM companies, however, have always refused to accept responsibility for harm resulting from their products, and it would appear overly optimistic to suppose that they will not exert extreme pressure to prevent the Government from enacting any meaningful legislation. Insurance companies have refused to insure farmers against GM contamination. In the United States, farmers whose fields have been contaminated with spurious GM plants have been heavily fined for breach of GM licensing regulations. This fact has caused many American farmers to continue planting GM crops year after year in spite of their lower yields and increased chemical use, in order to avoid the greater financial loss of being sued. For consumers, there will be no possibility of exercising the choice the Government has promised, of being able to avoid GM-derived food: products from animals given GM feed will not have to be labelled

With all this evidence in hand, but with the World Trade Organisation (at the instigation of the United States) threatening the United Kingdom and the rest of Europe over the GM moratorium, and with the powerful GM corporations exerting their influence, the Cabinet sub-committee on biotechnology met on 10 February to discuss the issue of approval of GM crops. It was chaired, not by the Chief Scientific Advisor, who sat on the

sub-committee and who also led the GM Science Review Panel, but by the Foreign Secretary, Jack Straw. This is one more clue that the Government has sacrificed science, economics and the will of the people for political reasons.

Eva Novotny is SGR's Co-ordinator for GM Issues

References

1. Prof Joe Cummins of the University of Western Ontario, in an article sent in April 2000 to the Institute of Science in Society (ISIS), citing the following references: Fujii, T and T. Ohata, 1994, *J. Toxicol Sci.*, 19, 328; EPA/OTS : DOC #88-920003678; Watanabe, T. and T. Iwase, 1996, *Terat. Carcinog. Mutagen.*, 287, 1996; Watanabe, T., 1997, *Neurosci. Lett.*, 222, 17; Watanabe, T., 1995, *Teratology*, 4, 25B.
2. U.S. EPA (Environmental Protection Agency), 1990, HOE 039866 Technical. Data Evaluation Record, cited in Cox, 1996, *op cit.*, Estuarine invertebrate toxicity test; U.S. EPA, 1986, Data Evaluation Record, cited in Cox, 1996, *op. cit.*, Aquatic invertebrate acute toxicity. Soluble concentrate 200g/l. Also: Friends of the Earth Briefing Sheet by Emily Diamond, Genetically Engineered Oilseed Rape, Nov. 1997.
3. See <<http://www.indsp.org/MalcolmHooperSummary.php>>
4. A farmer in South Cheshire growing FSEs from 2000 to 2002 (Ref. johnsons.farm@tinyworld.co.uk)
5. *SGR Response and Annexe to the GM Science Review – First Report*, 2003, available from <www.sgr.org.uk>
6. *Letter to Mrs Beckett MP – New Evidence of Long-Range Pollination by Maize* (6 February 2004), available from <www.sgr.org.uk>
7. *Ibid.*
8. Soil Association, *Organic farming, food quality and human health*, 2001, p. 3.
9. British Medical Association, *Genetically modified foods and health: a second interim statement*, March 2004, available at www.bma.org.uk.

The GM debate: a matter of science or technology?

Anne Chapman argues that distinguishing between the science and the technology of GM would benefit the public debate

One of the features of recent debates about genetically modified crops has been the way that certain scientists have argued in favour of this technology and portrayed opposition to it as 'anti-science'. Indeed this characterisation of the anti-GM movement is one the government itself has fostered, notably in Tony Blair's speech to the Royal Society in May 2002. I am sure that members of SGR will agree that to be opposed to

the commercialisation of genetically modified crops is not to be opposed to science. Non-Governmental Organisations campaigning against GM foods and crops have raised no objections to the science of genetics. What they are concerned about is the technology of genetic engineering.

Partly those concerns are about the possible harm that genetically modified crops and food may do to

the environment and to human health. In particular they question the sufficiency of current knowledge: do we really know enough about genes to know what we are doing when we produce a genetically modified organism, or about the ecosystems of the British countryside to be able to say what the effects herbicide resistant crops will be? Answering these concerns obviously requires scientific investigation, not only by

geneticists but by ecologists, toxicologists and other disciplines. However, there are many other types of concerns that science cannot address: that GM crops will increase the domination of agriculture by large, multinational corporations; that GM crops are an extension in the direction of industrialisation of agriculture, and that instead we ought to be moving in the other direction towards organic agriculture that works with, rather than against natural processes; that to change the genome of an organism by direct intervention is to 'play God', because we are trying to proscribe exactly what the organism is like and therefore does not show due respect towards it; that GM crops are simply not needed to supply us with healthy, nutritious food. That science cannot provide answers to these concerns does not mean that it is not possible to have rational debates about them, nor that there are no facts relevant to such debates. However, it does mean that debates about these technologies are not debates about science.

Unfortunately official thinking does seem to regard the GM debate as being only a debate about science. Thus the House of Lords third report on science and technology, published in 2000 was concerned with the processes whereby positions are taken on issues such as nuclear waste and GM food, but saw these issues as a matter of the relationship between 'Science and Society'. The government consultation on the 'biosciences' launched in December 1998 was not about sciences such as biology, zoology, biochemistry, genetics, etc. but matters such as

cloning, genetic testing and genetically modified crops. And the Government's White paper on 'Science and Innovation' (July 2000) talks about 'risks from science', when it does not mean risks from scientific investigation or knowledge, but risks from the technological fruits of those investigations.

Science is further intertwined with technology in the White Paper because the main role of science is seen as being the 'feeding' of innovation: providing new knowledge from which new technologies can be developed. This promotes a particular type of science and a particular type of technology: not science that seeks to understand the world to enable us to act in it more effectively, and less disastrously; nor technology that is developed from ideas for improvements that arise in the course of practical dealings with artefacts; but a science that results in new, patentable products, and a technology that involves the application of new scientific understandings.

Such 'cutting edge' technology is often inherently risky because the science on which it is based is limited. All the science that we have does not (and probably never will) give us a complete account of the world, rather it is patchy – providing models, concepts and laws that apply to particular aspects of the world, under limited conditions. We can thus never know, before we try something out, just what its effects will be. Even when we do try something out we may miss those effects for years, because we did not know where to

look. Thus the effects of CFCs on the ozone layer, or of organo-chlorines on health, were not discovered for several decades after the introduction of these substances. Importantly, their discovery involved scientific disciplines other than the organic chemistry that had discovered how to synthesize the chemicals in the first place. Evaluation of the safety of technology therefore needs to include knowledge from the many different disciplines of science, but also from non-scientists because much relevant knowledge, such as on how things are done in practice, is often held by people who are not scientists, but who are mothers, farmers, engineers, workers, etc.

Situating technology within science, as done in current policy, is thus inadequate to fully address concerns about safety and leaves concerns that are not about safety unaddressed. The Government seems to recognise that there needs to be a wider debate about issues such as GM crops. That debate may be made less acrimonious if both the government and the pro-GM scientists realised that it was about a technology, not science. And because technology is one of the things that makes the world that we all share, it is legitimately of public interest and concern.

Anne Chapman worked as an environmental consultant for 15 years. She is currently at Lancaster University, writing her PhD thesis on the philosophy of science and technology.

Book Reviews

Web of Deceit: Britain's Real Role in the World

Mark Curtis

Vintage, London, 2003, 512pp.,
£7.99, ISBN 0-09-944839-4.

The title of activist-historian Mark Curtis's recent book tells it all: "Web of Deceit. Britain's Real Role in the World". It is worth quoting

immediately from the foreword by journalist John Pilger: "*Mark Curtis's brilliant, exciting and deeply disturbing book unwraps the whole package, layer by layer, piece by piece. Not since Noam Chomsky's Detering Democracy, has there been such a disclosure, whose publication could not be more timely.*"

That comparison to Chomsky is not made lightly. Curtis powerfully demolishes the rhetoric behind the US-led invasions of Afghanistan and Iraq, revealing how they fit a pattern,

not of humanitarian intervention, but of control of 'Third World' natural resources and markets through the installation of US-friendly 'democratic structures'. Drawing on formerly secret UK government files, Curtis also reveals the complicity of successive British governments, whether Labour or Conservative, in supporting the US in its role as number one rogue state, as well as pursuing its own repressive policies in Kenya, Malaya, Oman and the now depopulated island of Diego Garcia in

the Indian Ocean. Curtis maps all of this out with clarity, impeccable research and an admirable forthrightness.

The ongoing furore over the failure to find so-called 'weapons of mass destruction' in Iraq, and the deceptions underpinning the various dossiers published by the UK government, just might - finally - give the lie to Tony Blair's 'sincerity'. No one who reads 'Web of Deceit' can doubt that Tony Blair has long been duping the British public, with the usual assistance of the 'free press'. At the Labour party conference in 2001, Blair declared: "I tell you, if Rwanda happened again today as it did in 1994, when a million people were slaughtered in cold blood, we would have a moral duty to act."

The mainstream media reported those words without challenge, omitting to mention that the British government had contributed to genocide in Rwanda. As Curtis points out: *"Britain used its diplomatic weight to reduce severely a UN force that, according to military officers on the ground, could have prevented the killings. It then helped ensure the delay of other plans for intervention, which sent a direct green light to the murderers in Rwanda to continue. Britain also refused to provide the capability for other states to intervene, while blaming the lack of such capability on the UN."*

This information is publicly available, but mainstream media and the academic community have simply chosen to look the other way.

Similar subservience to power can be seen in reporting the murderous war in the Democratic Republic of Congo (DRC), at the cost of more than three million lives. Curtis writes: "Britain sold arms to Zimbabwe, Namibia and Angola, who intervened to support the DRC regime, at the same time as supplying Uganda and Rwanda, who were fighting the DRC and its allies."

The International Institute for Security Studies in South Africa has commented on the impact of British greed: "Britain is inflaming the situation by arming both sides."

Such awful examples of British foreign policy - which represent the norm, not exceptions - do not fit the exalted self-image of benign western

states wielding power in the defence of "all who believe in progress and pluralism, tolerance and freedom" (Bush), or in order to uphold "values of justice, tolerance and respect for all regardless of race, religion or creed" (Blair).

Britain's Labour government has claimed that it wants to be a 'force for good in the world'. As Curtis demonstrates so convincingly, from the immorality of British foreign policy in Iraq, Afghanistan, Kosovo and Indonesia to its support for repressive governments in Israel, Russia, Turkey and Saudi Arabia, the *"reality is that Britain under New Labour is a systematic violator of international law and ethical standards in its foreign policy - in effect, an outlaw state. It is a key ally of some of the world's most repressive regimes that is consistently condoning, and sometimes actively aiding, human rights abuses."*

Curtis highlights the unmentionable fact that Britain is *"one of the world's leading apologists for, and supporters of, state terrorism by allies responsible for far more serious crimes than Al Qaida or other official threats."*

How is this state of affairs possible in a modern, democratic country where we have perhaps the finest public broadcaster in the BBC, and where we supposedly have at least one, if not two, 'progressive' daily newspapers, namely The Guardian and The Independent? In perhaps the book's most important section, titled "The Mass Production of Ignorance", Curtis explains that "the media definition of 'objective' in reality means working within the consensus among the elite." He continues: *"The liberal intelligentsia in Britain is in my view guilty of helping to weave a collective web of deceit. To read many mainstream commentators' writings on Britain's role in the world is to enter a surreal, Kafkaesque world where the reality is often the direct opposite of what is contended and where the startling assumptions are frighteningly supportive of state power."*

Curtis gives several examples of liberal commentators providing a fig-leaf of respectability for Blair's crimes. A faithful member of this

retinue is The Guardian's Polly Toynbee who opined that Blair's speech at the October 2001 Labour party conference "will stand as a moment British politics became vigorously, unashamedly, social democratic. The day it became missionary and almost Swedish in pursuit of universal justice". Toynbee noted Blair's "noble sentiments for a new world order", and that he declared "war on poverty, tyranny and injustice while barely using the word 'war' at all".

The article was entitled: "He promised to take on the world. And I believed him".

Thus, in the prelude to the US-led invasion and subsequent occupation of Iraq, a largely uncritical mass media has relayed great swathes of US and UK government rhetoric, distortions and lies, while consigning great chunks of history and relevant context to Orwell's infamous 'memory hole'. As Curtis observes, "the British public has been subject to a [propaganda] campaign of perhaps unprecedented heights in the post-war world."

Curtis's book is an essential tool in helping to counter such propaganda by boosting public understanding of how elite state-corporate power is shaping the world along lines of injustice, cruelty and suffering. 'Web of Deceit' deserves a very wide readership indeed.

David Cromwell

David Cromwell is co-editor of *Media Lens*. Sign up for free media alerts at www.medialens.org

Real Science: What It Is, and What It Means

John Ziman

Cambridge University Press, 2000, 412 pp., £18.99 (pbk), ISBN 0-52-177229-X (hbk), 0-52-189310-0 (pbk),

John Ziman, the author of "Real Science: what it is, and what it means", is a member of a threatened species. He is not only an ethically-motivated and internationally recognised theoretical physicist (he became Professor of Theoretical Physics at the University of Bristol in

1964, and his research on the electrical properties of metals earned him a Fellowship of the Royal Society in 1967), but he has written enlightened accounts of the nature of science for more than forty years. His understanding of the 'culture' of science, its language and habits of thought are informed by his career as a scientist but also by a profound grasp of the whole edifice which one recognises as science. His writing in "Real Science: what it is, and what it means" has a departmental coffee-room style of delivery and his examples are derived from the everyday life of a scientist, but this does not lead to any lack of incisiveness. Overall the book challenges and provokes deeper thinking about what actually comprises the scientific approach to the world.

Over the past four decades John Ziman has produced a series of books and has spoken about what science is all about in the manner of an ongoing research project. His concerns about the various ways in which science has changed over this period are ones that will doubtless be shared by members of SGR. Although he has produced volumes which delve into the ways in which science operates and creates a culture of activities shared by each of its members, he has, at the same time, avoided being embroiled in the skirmishes of the Science Wars. But like a handful who are involved in that campaign John Ziman is able to illuminate the ways in which science operates - a realisation that whilst science is part of human discourse with the world, it potentially possesses tools which are able to yield reliable knowledge (the title of an earlier tract of Ziman's).

"Real Science" is in many ways a revisiting of Ziman's abiding concerns expressed in his previous work but with some unexpected views. This adds spice to the outcome of reading the book. A major aspect of "Real Science" is the restatement of the now rather traditional view of science as propounded by the American social theorist R K Merton, that is, the view that the scientific approach consists of a group of norms such as communalism, universality, disinterestedness and organized scepticism. Such norms remain an embedded feature of what scientists

can and do claim about their view of the world. But set against this view Ziman argues that such norms did not hold sway throughout the history of science but only in "pure academic science", and even here only for a short period of time. He points out that since the late 1960s science has undergone profound shifts in how it functions and is funded, and its position in a modern world - the formation of a "post-academic science".

Although there is much to be concerned about in modern forms of science Ziman charts how the history of science has been one where change has been an integral part of the practice of science. Each of the norms of Merton's view is explained and discussed in the light of the "post-academic" form of science. But as is clear from even the most cursory of investigations of science policy and funding, "post-academic science" is heavily and obviously influenced by government and industry and these now impact on most of the normative structure of science. This influence is not only deciding the research agenda across the disciplines but also dictating just how the research should be evaluated. Wealth creation seems for many to be the fundamental purpose of much of what goes on in universities. This creates anything but the open climate of the liberal university which is touched upon in this book.

The book has ten chapters and these chart the rise of "post-academic science" and the significant move towards a more instrumentalist approach within science. Such a move has profound implications for the independence of those in science and especially in the universities.

Ziman lists many of the philosophical problems which are inherent in a simplistic view of the place of science in society. "Real Science" contains a number of 'evolutionary' and 'natural' models to describe Ziman's view of the scientific enterprise, some of which have been challenged by philosophers who have reviewed the book!

The style of writing, although intended for the lay reader, will have a more significant impact on those trained in science, because it is such

readers who will appreciate the terrain that the book describes so thoroughly. The writing is engaging, does not dumb down, and gives the low-down on the internal structure of science, including the policing methods (peer review and standards which are rational and 'objective') which ensure the reliability of the products of science - on the whole. The reader of this Newsletter will recognise many of the issues which "Real Science" discusses as being part and parcel of contemporary science. This is especially so for the impact of vested interests and the hijacking of the ethos of a liberal and open society of scientists by commercial interests and methods.

The book is well referenced and the ease of reading, for me, was only limited by the most infuriating methods of citing references that I have ever come across, despite the author's intentions! That negative comment aside I would strongly recommend this book for anyone who thinks that contemporary science is part of human discourse with its inherent bias and that the agenda of science in both teaching and research is increasingly subjected to the influence of vested interests.

Chris Langley

Political Islam in Southeast Asia: Moderates, Radicals and Terrorists

Angel Rabasa

OUP/ISS, May 2003, 82 pp., £17.50, ISBN 0-19-852911-2.

Compartmentalisation of the world, from geography to existence, is the way people seem to think these days. We divide space vertically, horizontally and even laterally; there is no room for continuity! So it is not surprising that we also compartmentalise the study of religion, from Christianity to Hinduism. Alas, now we divide religion into many more subdivisions, from moderates, radicals and now a new category: terrorists!

So you can imagine the prejudice I had even before I began to read this

article, looking at the title “Political Islam in Southeast Asia: Moderates, Radicals and Terrorist” by Angel M. Rabasa (Adelphi Paper 358). Like many before him, the author merges two separate constituents, Islam and politics, then divides the child of this unhappy marriage into three categories, moderates, radicals and terrorists. Alas, this is the way the West studies other peoples, by dividing them up into little categories, then slots them into little boxes, followed by avid deconstruction and reconstruction. However, I always wondered who defines these new reconstruction norms. After all, a terrorist to one could be a freedom fighter to the other.

The author has failed to establish an integral prelude to the paper in that he fails to clearly define these three above mentioned invented categories. Perhaps the author, belonging to the intellectual elite, may find the definition obvious, but this is not so to the layman. However, I must admit that the author has done his homework since the historical account elucidated is well-referenced, and rather accurate in many instances. However there are some problems in the selection of historical account presented in the paper. One example is that the author does not go into enough detail on the Palestinian issue and the effect of this crisis on the Islamic movements in this region and the rest of the world. I will come back to this later.

Like many papers on the issue, this paper is rather normal since it is rather dry, and does not explore ‘uncharted regions’ pertaining to the problem. The argument does seem like a broken record, something you would hear on CNN although it would be very interesting for those who are already fascinated by the issue. So this is not for tea-time reading folks! Also the arguments, like many other modern papers are rather scientific but like many matters, something you just cannot explain them via science. For example, traditional society, especially in the East, places more importance on dignity, even more so than death. To them, death is merely a part of life, it is not an end but a beginning. However, dignity to these people is crucial to their cultural strength and vibrancy. You take that away and you have taken away a lot. Now how does one explain this

phenomenon in one sentence? In the words of Albert Einstein “the intuitive mind is a sacred gift and the rational mind is a faithful servant. We have created a society that honors the servant and has forgotten the gift”. Truly this paper honors the servant.

To keep this short, I will try to highlight just some of the contentions I had with the paper. Firstly, the paper seems to indicate that economic vibrancy does not ensure moderation in religion, and he uses Singapore as an example. One would agree that Singaporean Muslims are rather well off compared to their counterparts in other parts of the region. However, the author has failed to clarify the existence of an American military base in Singapore. He also does not mention the cooperation of the Singaporean government with the Israelis on military and intelligence issues, a matter that has created a lot of discontent among the local Muslim population, or some would say, a loss of dignity within this community. Secondly, the author mentions the problem of southern Thailand, but again did not mention the historical context of the struggle. He fails to mention that parts of Southern Thailand used to be part of a historical Malay state (before the invention of Malaysia by the British) and the supposed heirs to these sultanates are still residing in the Middle-East. Combine that with the fact that the Malays are a “Sultanate” society, and you have many important issues to discuss. After all Malaysia is the only country in the World with 9 Sultans and a King!

Most importantly, the author is too concerned with the three explicit categories that he fails to address the most important constituent, the ordinary people. As the foreigners leave the country which they see as hostile for ‘safer’ countries, what choice do the locals have? What are these governments to do now? For a region well known for its atrocious human rights record, what does the West require of these governments, when it asks the local authorities to clamp down on so-called terrorist organisations? What are the poor farmers to do when they were told to kill their lands with pesticides and agro-chemicals, thus making these people dependent on the West? Who are the terrorists?

It was America who helped Suharto into power, again not mentioned in the paper, and in doing so, thousands of innocents were killed. In 1975, Indonesia invaded East Timor. Although the occupation was declared by the UN to be illegal, effective action did not follow and a third of the East Timorese population were killed, with extreme prejudice, while Western governments remained silent, or, like Britain, sold arms worth billions of pounds to Indonesia.

The author repeatedly mentions how the extremists were trained in Afghanistan during the war against the Soviets. Reading the paper, it seems that this is the one overriding factor to extremism in this region. Does the author expect us to believe that the governments of these regions did not know about this during the war? Why did they allow their citizens to go to Afghanistan in the thousands? The answer I got from a friend who lives in California. He told me that during the Afghan-Soviet War, they were hanging Mujahideen figurines on their Christmas trees, since they were heroes to the Americans and thus the local regimes then. Alas, have we forgotten that America participated in this earlier conflict and helped train these individuals? When they were no longer “useful”, they returned to their home countries and now the locals are blamed for the actions of these people. Why was this fact not mentioned in the paper?

Trust: this is the key to peace and harmony. How does one trust America? Perhaps one option is to be honest and admit past mistakes. It is difficult to move forward when previous wounds have not healed. Some say this is the beginning of a new era. The world is no longer safe. Well, the world has never been safe especially for the millions of people stricken by abject poverty, the people who have no voice and are never heard. But who cares about justice? We just need to make sure those tourists keep spending their dollars here. We need to keep those foreign investments coming, and for this, we will pay any price. But the thing is, it is not we who pay the price; it is again and always the poor and defenceless. What price is too high to pay? We should ask ourselves this question, and perhaps we will learn something

about ourselves and what we have become.

In conclusion, the paper is an interesting read and I would recommend it to anyone who wants to get an overview of "Political Islam" in the region since it is well researched. However, I would caution readers to be aware that, like many papers such as this, it is a paper with a focus, i.e. the writer's focus! Biodiversity is crucial to life on the planet, but cultural diversity is crucial to the survival of the Human race.

Yunus Yasin

The Use of Genetically Modified Crops in Developing Countries

Nuffield Council on Bioethics, 2004, 122 + xx pp, ISBN 1-90-438407-2.

Available from the Nuffield Council on Bioethics, 28 Bedford Square, London WC1B 3JS; email: <bioethics@nuffieldbioethics.org>.

£10 (including postage) to all European countries (EU or non EU), £15 (including postage) to countries outside Europe, and no charge for orders from developing countries. Available as a pdf file at: <http://www.nuffieldbioethics.org/filelibrary/pdf/gm_crops_paper_final.pdf>

This discussion paper is a follow-up to the Nuffield Council on Bioethics (NCB) May 1999 publication 'Genetically modified crops: the ethical and social issues' (available online from their website). The paper reviews the arguments of the 1999 study, taking into account developments in science and policy which have taken place since then.

The discussion paper addresses all of the major objections to the development and use of GM crops in developing countries. These objections fall into two main categories, those concerned with risks to health and environment, and those concerned with corporate control of food supply. The paper considers the main lines of objection within each of these categories, weighing them against potential benefits, and ultimately concludes that:

...there is an ethical obligation to explore these potential benefits responsibly, in order to contribute to the reduction of poverty, and to improve food security and profitable agriculture in developing countries. (p xiv)

The fundamental argument on which the NCB conclusion depends is that food security in developing nations is a problem which is getting worse, and that given the present socio-political climate this problem will not be solved in the near future by redistribution of existing food supplies, even supplies within the developing nations. For the NCB, GM crops provide a significant hope for providing food security to the rural poor in developing nations, a greater hope than that offered by organic or conventional agriculture.

The discussion paper consists of an initial "Summary and recommendations", six chapters and five appendices. The first introductory chapter sketches the possible risks and benefits associated with GM crops. It also locates the discussion in the global socio-political context.

The second chapter focuses on the socio-economic context and the importance of agriculture in reducing poverty: *"Seventy per cent of the world's poor live in rural areas and depend mainly upon agriculture for their livelihood. ... The role of agriculture in reducing poverty is therefore crucial"* (p15). In this chapter the NCB argues that to reduce this poverty, growth of productivity in staple crops has to be increased, either through expansion in farmland or increase in yields. But, they argue, expansion of farmland is not feasible because existing crops cannot grow on the land that is available (environmental constraints), and conventional plant breeding is not providing the increasing yield that it once did (during the Green Revolution). They believe that GM crops could meet both of these needs - GM could provide crops that are better suited to environmental constraints, and crops producing higher yields could be quickly developed.

With regard to developing the technology, the main conclusion of

the NCB is that *"possible costs, benefits and risks associated with particular GM crops can be assessed only on a case by case basis"* (p xiv). Their optimism about the use of GM technology is based on their main finding:

GM crops have demonstrated the potential to reduce environmental degradation and to address specific health, ecological and agricultural problems which have proved less responsive to the standard tools of plant breeding and organic or conventional agricultural practices. (p xiv)

The third chapter is devoted to the current and potential uses of GM crops in developing countries. The first third of the chapter introduces the technology itself, and provides a statistical sketch of global production of GM crops. The major portion of the chapter is devoted to eight case studies of GM crops that are, or may be, beneficially used in developing countries, including the high-profile cases of Bt cotton, Golden Rice and virus resistant sweet potato. Whether the promise of these cases has been, or will be, realized is still an open question. The NCB is optimistic about the benefits of these, and other, GM crops, and their argument is built on this optimistic foundation. The argument is further supported by Appendix 3 which lists fifteen examples of different GM crops with relevance to developing countries.

The fourth chapter addresses various social and political questions about the need for GM crops. These questions include whether GM crops are needed since enough food is already produced world-wide to feed the global population; and whether alternative forms of agriculture, such as organic farming, are better suited to improve agricultural production in developing countries. Also in this chapter the NCB addresses the use of the precautionary principle which is often used to oppose introduction of GM crops, especially with respect to the question of GM food safety.

With regard to current food supplies the NCB accepts that there is enough global production of staple crops to feed the present world population but argues that since much of this

currently goes to feed cattle and poultry :

...the provision of 3,600 calories (or even only the recommended 2,000-2,500 calories), daily for each person from existing production of staple crops would require the consumption of meat, dairy products, eggs and poultry to be abandoned. (p47)

The NCB sees GM crops as something to be developed in addition to other methods of agriculture, but they do not see organic farming as a solution to the problems of food supply in developing nations because the conditions are generally so poor that there is little left over to replenish the land.

In response to the precautionary argument that new technologies such as GM crops should not be introduced unless the risks are negligible, the NCB argues that in developing nations the risks of introducing GM crops must be weighed against the very real risks of doing nothing. Unlike agricultural practice in wealthy societies, developing nations are at great risk if nothing is done. For the NCB, to avoid GM is to do nothing! They ask: *"What are the risks of the non-GM approach, that would constitute the option of 'doing nothing'?"* (p58). With respect to the safety of GM food they conclude that *"there are no proven health damages arising from the consumption of GM crop products on the market as yet"* (p61). What they should add is that neither is there any proof, as yet, that the consumption of GM crop products is safe.

The fifth chapter surveys the various international regulations governing the approval and sale of food. The five main sets of regulations are the World Trade Organization agreements, the Codex Alimentarius, the Cartagena Protocol on Biosafety, the International Treaty on Plant Genetic Resources for Food and Agriculture, and the Directives and Regulations of the EU. With regard to the EU regulations the NCB argues that the requirements of traceability and labelling *"tend to discriminate strongly against poor small-scale farmers"* (p81). This is because of the difficulty of segregating GM from non-GM crops, and the cost of verifying the GM content of the crop.

They conclude that the EU has *"not taken sufficiently into account the negative effect these policy instruments are likely to have ... in developing countries"* (p82).

The sixth and final chapter discusses the control of and access to GM technologies. GM technologies and materials are almost entirely owned as intellectual property by the private sector. This intellectual property is regarded as a valuable asset and is not freely distributed (as it was before government policies pushed science into the hands of the private sector). The consequence of this is that without commercial sector benevolence poor countries will not have access to this technology. Evidence of such benevolence has been seen in the development of Golden Rice, and the NCB reports other initiatives which can contribute to the sharing of intellectual property with poor countries. For this reason the NCB recommends that *"additional resources be committed by governments, the European Commission and others, to fund a major expansion of GM-related research into tropical and sub-tropical staple foods"* (p90). They go on to say that those sponsoring the research should be proactive with representative groups in developing countries to determine the priorities for research.

In conclusion it should be said that the NCB makes a good, if not compelling, case for the development of GM crops for developing countries. The strength of their case lies in their recognition of the practical, global socio-political, constraints on more radical solutions to the problem of food security in developing countries. Moreover, they are clearly aware of the objections that are levelled against GM food technology, and, on the whole, they provide reasonable replies. If the benefits to developing countries of GM crops, as well as their safety to health and environment, were more well established, then I would tend to agree with the NCB. But as things stand these are still open questions, and non-GM solutions to food security should be pursued with at least as much vigour as potential GM solutions.

Richard C. Jennings

Seeds of Deception: exposing corporate and government lies about the safety of genetically engineered food

Jeffrey M. Smith, with a Foreword by Michael Meacher.

Green Books, Totnes, Devon, 2004, 256 pp., £9.95, ISBN 1-90-399841-7.

Originally published in the USA in 2003 by Yes! Books, Iowa.

After reading this book, no one could feel complacent about eating genetically engineered food. These pages expose the incredible deceptions to which Monsanto and other companies purveying genetically modified (GM) seeds have resorted to get, and keep, them on the market. America's Food and Drug Administration (FDA) is revealed as a collaborator, by purposely declining to perform its function of ensuring that the food on America's tables is safe. Even the media in the United States seem to have been part of a conspiracy to silence any criticism of the safety of GM food. It all began with the instructions to promote the industry that were issued by President Bush the elder, the policy being continued throughout succeeding administrations to the present time. Not even outright death of consumers (as occurred in at least one episode) has stopped the seed companies or the 'regulating' agencies from pushing these multi-billion-dollar products. During the Starlink episode, the FDA did not contact health authorities, even after it was clear that the public, especially children, were at risk of allergy. While the book is concerned primarily with lack of regulation in the United States, a similar lack exists in the United Kingdom: government agencies and advisors wave aside objections from independent scientists. The 'revolving doors' between government agencies and GM corporations on both sides of the Atlantic result in corruption that benefits vested interests to the detriment of the health of the populations.

The stories told here will be familiar to anti-GM campaigners; but even the campaigners can expect to find new outrageous details. My first shock came on the first page of the Introduction. In January 1999, a consultant told how his company had helped Monsanto shape its future. Asked what would be the ideal in 15 to 20 years' time, Monsanto executives said they wanted a world in which 100 % of all commercial seeds would be genetically modified and patented. The profits to the seed developers would be enormous. Dr Arpad Pusztai's first shock with genetic engineering came when the director of his institute, Prof Philip James, asked him and his wife and co-worker, Dr Susan Bardocz, to pass judgement on a 700-page pile of application papers seeking approval for various GM crops. Prof James was a member of a regulatory committee, but he himself was not qualified to evaluate the applications; and a decision was needed for an imminent ministerial meeting. In less than the 2 ½ hours the Pusztai's had been allowed for the job, it became obvious that the research had been so poorly designed and executed that the applications should not be accepted. When Dr Pusztai telephoned to give the verdict, a bemused minister told him that Prof James had already given approval -- two years earlier.

It would be no wonder if GM foods did prove to be damaging the health of all who eat them. Laboratory animals have shown numerous abnormalities, including growths suggesting a pre-cancerous state. In human beings, such growths would take years to develop into cancer. The very basic tenet on which genetic manipulation is based is now outmoded: it is the simple principle that each gene acts alone and produces one, and only one, protein. Yet fruit flies contain a gene that can produce 38,016 proteins. The possibilities for unintended effects of introduced genes are vast, for reasons described in Chapter 2, including instability of inserted genes. Prof Richard Strohm says that the GM-seed companies know the theory they have been using is wrong, but "they don't want to look at it because it's too complicated and it's going to cost too much to find out."

Numerous instances are cited of GM corporations' control and manipulation

of the research and the careful selection amongst the results of research to ensure that the required outcome is achieved. These malpractices occur even in university laboratories, which may receive funding from the industry. When testing showed that normal cooking could not destroy the GM-generated toxin in Starlink maize, the cooking-time in the experiment was increased by a factor of four, so that Monsanto could claim that the food would be made safe by cooking. When stomach acid and an enzyme were supposed to break down a GM protein, but experiments showed that they did not, the acid concentration was elevated from pH 1.2 to 2.0 and the relative amount of enzyme was increased by 1,250 times. When Calgene tested its FlavrSavr tomato on rats, 7 out of the 40 GM-fed animals unexplainedly died within two weeks; but the tomato was put on the market. The saga of the growth hormone rbGH (or BST) given in the United States to cows to increase milk production is treated extensively. Fortunately, Canadians and Europeans have obtained the facts and have resisted its introduction.

Monsanto's manipulation does not end in the laboratory. Whenever news was about to break that would expose its machinations, Monsanto quickly stepped in with threats that prevented publication or broadcast. In the United States, the news blackout was virtually complete. Meanwhile, the FDA pursued its policy of doing nothing – or almost nothing. When one company introduced GM strains of bacteria to produce the nutritional supplement L-tryptophan, nearly 40 deaths and thousands of illnesses resulted. The FDA carefully avoided implicating genetic engineering and blamed L-tryptophan itself. The incident was used as an excuse to institute new regulations against the supplement, furthering the FDA's desire to eliminate non-drugs.

Steven Drucker, a public interest attorney, headed a lawsuit against the FDA for failing in its duty to ensure the safety of the nation's food. The case rested on two grounds, religious and scientific. Drucker forced the FDA to hand over 44,000 pages of internal files, showing frauds, warnings from its own scientists and cover-ups; yet the FDA had always maintained its stance that GM foods

were safe and that they had no evidence to the contrary. Drucker prepared a seamless case, proving that the agency had lied and had failed in its regulation of GM products. The verdict of the court rested on a technicality: because the FDA had not, in fact, been regulating the GM industry, it had no case to answer.

In a book containing masses of information, a slip or two in strict accuracy is inevitable. While it is technically true that the incidence of allergies in the United Kingdom increased by 50% after the introduction of GM soya into food, the actual numbers of cases amongst the random samples of 100 people tested were too small to justify such a general statement: there were 10 cases in 1998 and 15 cases in 1999. What is significant is that soya leapt from 14th place in the list of allergens to 9th place. This was the first time that soya had reached such a high position in the list.

What of the oft-quoted argument that GM foods are clearly safe, because Americans have been eating them for several years with no ill effects? This question begs another: how do we know that there have been no ill effects? No one has been monitoring; and, given the fact that the food is not labelled as GM, and therefore no one knows who is eating how much of it, proof that GM food had caused an increase in one or more health symptoms in the population would be extremely difficult to gather. But it has been reported that the number of illnesses caused by food in the United States has doubled over roughly the same period that GM foods have been consumed. There are now 76 million such illnesses per year and 5,000 deaths. Many other illnesses, including lymphatic cancer, are also on the increase. Animals, with wisdom unavailable to human beings, refuse to eat GM food if a non-GM variety is available. Several stories reporting these incidents are told on pages separating the chapters.

Anyone who believes the claims of the industry that GM foods are safe, or believes the assurances of the regulating agencies that this is so, needs to read this book.

Suggestions are made in Chapter 9 for grass-roots measures to eliminate

genetically engineered foods. Europe has for several years been aware of the dangers; and in America, the people's voice is beginning to be heard and is inducing some food-chains to eliminate GM foods from their own brand. This book is a powerful weapon in the battle against genetically engineered food. Jeffrey Smith has done every human being a great service by writing it.

Eva Novotny

Protecting Critical Infrastructures Against Cyber-Attack

Stephen Lukasik et al.

OUP/IISS, 2003, 98 pp., £17.50.
ISBN 0-19-853016-1.

This book (Adelphi paper 359, published by Oxford University Press and the International Institute for Strategic Studies) deals with the possibility that intentional cyber-attacks on the computers that run or control infrastructures such as the electricity grid, telephone systems or transport systems could disrupt those infrastructures to the extent that they "can have a significant impact on the physical and economic well-being of a country and its people". Cyber-attacks are such events as organizing a large number of computers to send so many messages to a target computer via the internet that it cannot attend to its normal tasks; or logging-on surreptitiously to a target computer and closing down its activities or even making it control connected equipment or information in undesirable ways.

The authors are two US academics, one of whom was Director of the US Defense Advanced Research Projects Agency, and a member of the British Ministry of Defence.

The book is well written and describes in a fairly abstract way, but with examples, the types of attackers, the sort of defences that can be set up by a government and the different strategies that can be made by different emphases on different sorts of defence. It then examines the choices of strategy that have been made by the US and the UK and goes on to apply its taxonomy of possible

strategies to various groupings of the rest of the countries of the world. It notes that the more prepared a country or organization is to defend itself against cyber-attacks, the more able it will be to launch effective attacks itself and quotes the estimate that 30 countries are developing information warfare capabilities.

The authors classify attackers as recreational hackers; terrorists; and sovereign states waging information warfare. They see all non-state interference with computers as criminal (as of course, in Britain, it now, in legal terms, is - since the Terrorism Act 2000 any usage of someone else's computer without authorisation can potentially be defined as a terrorist crime). They classify the people who have to deal with attacks as national governments and system owners and spend some time treating of the problems of mixed public/private ownership of infrastructure.

They use metaphors from military activity to describe defence options and outline a five stage process....

- 1 - Prevent attack on system
- 2 - If attacked, thwart achievement of the attacker's goals
- 3 - If damage is sustained, then limit the amount
- 4 - Having sustained damage, reconstitute the system expeditiously
- 5 - Learn from the attack and improve the protection process

In this analysis, damage refers to the computer system's information and functioning while reconstitution refers to the system controlled by it - in the case of the electricity grid it means restarting or repairing electrical equipment that may have been overloaded or switched off; in the case of a banking system it means unravelling unmatched or wrong transactions.

The book will presumably be most useful to governments and large organizations trying to set up a strategy to defend against cyber-attacks but there are also interesting asides for a wider audience.

There is a fascinating table, developed as part of the Y2K (Year 2000) computer damage limitation effort,

that describes the criticality of various infrastructures in terms of which other infrastructures depend on them. The top four in the UK as it is organised at present are Telecommunications, Electricity, Fuel supplies for transport and Road infrastructure (see <www.citu.gov.uk/2000/ey_study/ey_menu.htm>)

They recommend strategies aimed at prevention of attacks, with associated increased surveillance of internet traffic (with reference to Echelon and Carnivore systems), loss of privacy and an attack on the current nature of cyberspace - *"A long-term approach would be to reduce the lawless nature of cyberspace... by instilling greater ethical sensitivity in new users of information systems; making clear that cyberspace is private, except those areas openly designated as public; defining the bounds of acceptable behaviour by law; and writing and enforcing contractual conditions on commercial transactions."*

They also piously hope that *"Sovereign states could agree not to undertake cyber-attacks on national infrastructures (a form of arms control)"*.

Less favoured is their strategy in "Case IV" where there is *"lack of confidence in preventing or thwarting attack and limiting damage from an attack"*. Here *"the strategy would suggest encouraging long-term changes in infrastructure architecture in the direction of greater local self-sufficiency, moving away from the heavy integration of infrastructures and seeking to minimise interdependencies."*

This would seem to chime with a greener approach to sustainable development over a whole range of infrastructure issues. But their favoured approach will lead to more and more central control over the Internet, computer systems and human activity in general.

Bob Kenyon

Bob Kenyon is an Information Technology professional with 30 years experience of using the Internet and its predecessor Arpanet

Designer Mice: A BUAV special report into the use of mice in genetic experiments

BUAV, 2002, 119 pp, £5.00.

Available from BUAV, 16a Crane Grove, London N7 8NN (add 50p for p&p). Available for downloading soon from <<http://www.buav.org>>

This report describes the creation and use in science of genetically modified (GM) mice. The aim of genetically modifying mice is to make them better models of humans and therefore more useful in assessing, understanding and treating human disorders and disease. It discusses the validity of the science based on genetic manipulations, it describes the suffering and waste of life that results from this, and it recommends alternative ways of achieving these aims.

The first chapter discusses the rapidly increasing use of genetically modified mice in science, the distress and suffering that results from this, and generally summarizes the key issues that the report addresses.

The second chapter discusses the welfare implications for GM mice. It describes the life style of the mouse in the wild including the physical, psychological and social needs of the mouse. It then contrasts this with the life of the laboratory mouse indicating the suffering of the mouse under laboratory conditions prior to any scientific procedures involving the mouse. The third chapter briefly describes the gene and its functions, and raises basic questions about the validity of scientific experiments using GM mice as models of humans.

The report presents a sustained and scientifically informed argument against the use of GM mice in science. The argument has three prongs. The first is the obvious suffering and death that mice suffer as a result of such use, the second questions the validity of GM mouse based science, and the third presents better alternatives to such use of mice.

The fourth and fifth chapters describe the process of creating GM mice and document the scale of mouse suffering

and death. Characteristics in GM mice include abnormal behaviour, congenital defects, immune dysfunction and metabolic dysfunction. Various university-based and commercial groups are involved in developing such mutated mice for research and testing.

The sixth chapter presents the central prong in the report's argument. Five main areas of research are identified for which GM mice are designed and used. These include using mice as models of human disease, as toxicological test subjects, as models of 'bioreactors', and as xenotransplantation models. In each case the report shows flaws in the science and suggests more humane and scientifically sound alternatives to the use of GM mice. The central prong has two critical barbs to it - the critique of current cases and the general critique of using mice to model human disease.

Clearly if the use of GM mice does not help in the most likely cases, then they are not likely to help in any case. One of the most likely areas in which GM mice might help is in understanding and treating unifactorial genetic diseases - genetic diseases that depend on a single gene. The report discusses three - Cystic Fibrosis, Lesch-Nyhan Syndrome and Tay-Sachs disease. In each case it concludes that the use of mouse 'models' is ill suited for research into these conditions, and therefore not likely to help in any case.

Of course the argument from unsuccessful cases to unsuccessful method is not watertight - we cannot simply move from the particular to the general. The method might work in other cases, or might, with refinement, be made to work in the cases discussed. But in understanding the failure of mice to provide satisfactory models of these diseases we recognize the great dissimilarities between mice and people - that the physiological system of the mouse is not the same as that of the person - and these differences undermine the attempt to use the mouse as a model for human disease.

The BUAV has a well developed line of argument that there are better available alternatives to the use of mice in researching on human

disorders and disease. Appendix Four of the report summarizes their thinking on alternative methods, but the reference to alternative methods is an integral part of their overall argument. For example, in a 2001 report they outlined a system of in vitro methods that could, with appropriate funding, replace the use of animals in toxicity tests ("The Way Forward: Action to end animal toxicity testing", BUAV, as above). With regard to the shortage of human organs for transplant and the research into xenotransplantation they advise an opt-out policy for organ donation. And for understanding the causes and control of human disease they recommend "combining data from human gene banks and detailed epidemiological studies" (p114), arguing that "clinical and population-based approaches have given the most reliable data to date" (p68).

Nonetheless the GM mouse industry continues to flourish - new designer mice continue to appear and more procedures are undertaken. Given the considerable suffering and death, and the negligible benefit, resulting from the GM mouse programme, the report questions whether the Home Office carried out a full cost-benefit assessment of this programme. A further problem is "the lack of transparency surrounding Government regulation of animal experiments" (p92). This and the secrecy that results from commercial protection of intellectual property rights undermines public knowledge of how animals are used, and suffer, in science, and this undermines the control of such uses. One of the report's recommendations is for "a full and detailed publicised audit independent of the Home Office of the cost-benefit aspects of such transgenic and mutagenic procedures which have been granted a licence in the UK over the past two years". (p94)

This report presents a strong, scientifically based, argument for the replacement of GM mice with alternative non-animal methods in the study and control of human disorders and disease. A viable programme of alternative methods is discussed and references to further literature supporting the programme is provided.

Richard Jennings

Letters

Woolly-minded optimism over renewable energy?

I would like to encourage other SGR members to do what they can to restrain the woolly minded optimism in the journal *New Scientist* concerning renewable energy. Their optimism is often sustained by misleading information. The following is but one of my attempts at correcting what they print, but such corrections, if they appear at all, are to be found as small notes at the end of the letters pages, and are probably not adequately noted. This was what I wrote.

On page 33 of *New Scientist*, 6 December 2003, Nic Fleming quoted Declan Pritchard, director of Wind Hydrogen, as saying, "We can produce a litre of hydrogen for about 20p, the same price as the tax-free price of a litre of petrol." The 20p figure is seriously misleading.

For one thing, it makes no sense to compare a litre of liquid hydrogen with a litre of petrol, since the energy density of liquid hydrogen is a quarter of that of petrol (8.4 compared to 33.5 MJ/litre). Thus in sheer energy terms, four litres of liquid hydrogen are required to replace one litre of petrol.

The best slant one can place on the matter is to take into account the superior efficiency of fuel cells in converting energy, and say that it would take only 2.3 litres of liquid hydrogen to provide the same 'motive energy' (ability to move a vehicle) as 1 litre of petrol. However, this still leaves Pritchard's 20p in fantasy land.

It takes 4 kilowatt hours of electricity to produce 1 litre of liquid hydrogen, thus 2.3 litres would require about 9 kWh. Even putting the cost of the electricity at 5p/kWh (and we are often told that offshore is twice as expensive as onshore), the starting cost is 45p per litre of petrol equivalent. To this must be added the cost of the electrolysis equipment (operated intermittently due to wind variability) and of producing the

liquid hydrogen and storing it. The alternative to using liquid hydrogen in motor vehicles is to compress it, but such a high compression is required to achieve an acceptable energy density (about 10,000 psi) that to start by producing liquid hydrogen is likely to be the most efficient route to obtaining the high compression.

Andrew Ferguson, Research Co-ordinator, Optimum Population Trust

MMR, GM and the funding of research

It's interesting that when a medical scientist produces a report contradicting governmental policy, as is the case with Andrew Wakefield's controversial suggestion that there may be a link between the MMR jab and autism, one of the most prominent features of the attacks on him are assertions that his research was probably biased because of who was funding him. Note that there have been no assertions that he has lied about his results, rather that his interpretation may be flawed. I know little about the topic but I find it hard to believe that a piece of work, that was obviously highly controversial but is apparently so wrong managed to get through the publication process in such a top flight journal as *The Lancet*.

Allegations against Dr Wakeman are intimating that it is impossible for researchers to retain complete objectivity when they are funded by an organisation that holds a particular institutional point of view. If such is the view of the upper echelons of academia, such as the General Medical Council, surely it is time for the government to recognise this fact with regard to those employed by the bioscience industry and to start funding substantial independent research into the potential ecological effects of GMOs. At a broader scale the issue highlights the need for independent researchers to be funded from non-biased sources and the need for academia to retain some independence from the overpowering interests of commerce or government

policy. Instead of the GM debate centring around a polarised GM-good or GM-bad debate, a broader approach that funds all possible routes to improving agricultural sustainability should be taken where all avenues receive similar levels of funding. If industry is happy to fund investigations into GM, perhaps government should be focusing its limited resources on alternative approaches that may not be of interest to industry, but may be in the public interest.

Dr Magnus L Johnson, Head of Centre, Scarborough Centre for Coastal Studies, University of Hull

Climate change and the nuclear lobby

I note from your excellent November issue that the great "global warming" panic, started in 1989 by the nuclear industry may be beginning to come unstuck.

I had my doubts from the beginning. The nuclear industry, shown to be deadly dangerous by Chernobyl, and totally uneconomic when Mrs Thatcher tried to privatize it, pulled its last attempt at justification with the old carbon dioxide theory of climate change.

Wouldn't anyone be suspicious who has noticed that Mrs Thatcher's press secretary, Bernard Ingham, moved on to a well-publicised game of "tilting at windmills" in the '90s, when these were obvious competition to nuclear power? And by the 2000s, he was signing his letters (one to the *Independent*, anyway) as from a "Nuclear Power Group".

Of course, the entire, naïve, green movement fell for the ploy – it might cut down on the environment destruction by cars and other forms of mass mobility. And anyone standing out against the CO₂ theory must be in the pay of big oil. Why no concern for the even more dangerous lobby of big nuclear?

Alternative and more convincing theories on climate abound. I was

impressed in 1997 by Nigel Calder's report on the work of Danish scientists on solar variation in his book, "The Manic Sun" (Pilkington). I summarize these theories by saying, "It's the clouds, stupid!"

And it was so clever of the nuclear lot to look at the weather. Weather is very variable, and one can always find a local extreme to make a bogus generalisation out of. Most of the hundreds of books and thousands of articles on climate change focus mainly on the 'what if' angle, and local catastrophes that then might happen. A profitable career for many, isn't it! But, as Calder points out, numbers count for nothing in the validity of scientific theories – or at

least they shouldn't count, if it weren't for the politics.

Yours for real science,

Roger Franklin

Response...

I'm very surprised to hear such scepticism from within SGR about the 'old carbon dioxide theory of climate change'. Contrary to your interpretation of (I assume) Clare Goodess's article in SGR newsletter 28, the evidence that human emissions of carbon dioxide are causing climate change remains very strong, while the evidence (including Calder's book) that solar variation is responsible

remains very weak. Detailed discussion of such evidence can be found, for example, in the reports of the Intergovernmental Panel on Climate Change and, contrary to what you assert, does not simply rely on 'what if' speculation, but on a comprehensive research effort spread across a large array of disciplines, and mainly carried out in publicly funded institutions. Sure there are gaps in the knowledge and important uncertainties to be resolved, but to assert that the threat of climate change is just a conspiracy by the nuclear industry is hardly credible.

Stuart Parkinson
SGR Director

SGR publications

'Thinking about an ethical career in science and technology' series:

- 'Unscrambling a space career from military forces' by David Webb (April 2004)
- 'Your career and sustainable development' by Philip Webber (December 2003)
- 'Career choice and climate change' by Stuart Parkinson (March 2003)
- 'Cleaner technologies: a positive choice' by Tim Foxon (March 2003)
- 'Career choice, ethics and animal experimentation' by Gill Langley (March 2003)
- Introductory booklet: 'An ethical career in science and technology?' (Summer 2001)

'Why the War on Iraq is a Warning for the Planet' by Philip Webber and Vanessa Spedding (April 2003)

'Evidence presented to the Chardon LL Hearing: Reports I-V' by Eva Novtony (May 2002)

These SGR publications are free to SGR members and can be downloaded from the website <www.sgr.org.uk> or ordered from the SGR office - contact details on back page

New articles and talks on the SGR website

- SGR Response to the 10 year UK science and innovation strategy consultation (April 2004)
<http://www.sgr.org.uk/SciencePolicy/Resp_10yrstrategy_apr04.htm>
- Thinking about missile defence (March 2004)
<<http://www.sgr.org.uk/ArmsControl/BradfordMar2004.ppt>>
- The Corporate Influence on Science and Technology (March 2004)
<<http://www.sgr.org.uk/SciencePolicy/SpeechGreenParty2004.htm>>
- Embrace the Ethical Dimension (April 2004)
<http://www.sgr.org.uk/EthicalCareers/ethical_careers_physics.pdf>
- Winners and losers in the GM debate (February 2004)
<http://www.sgr.org.uk/GenEng/GMDebate_19feb04.htm>
- SGR response to GM Science review (Oct 2003)
<http://www.sgr.org.uk/GenEng/response_GMScienceReview_15oct03.htm>
- Tackling Climate Change - the Role of the Engineer (Sept 2003)
<http://www.sgr.org.uk/climate/climate_change_WESTalk.html>

Plus: recent press releases/letters on GM crops, climate change and nuclear power, manned mission to Mars etc.

Join SGR - as a Member or an Associate

You can become a member of SGR if you are a scientist in the broad meaning of the word. Our members include biologists, chemists, engineers, geographers, mathematicians, physicists, psychologists, sociologists, students, teachers and people working in electronics and computing.

If you agree with SGR's aims and want to support our work, but are not a scientist, you are invited to become an associate member.

I enclose an annual membership subscription of £....

I enclose an annual associate subscription of £....

Rates:

£7.50 unwaged (minimum)

£12.50 low waged

£25 waged

... or 0.1% of annual income, if preferred

I enclose a donation of £....

(Please make cheques payable to Scientists for Global Responsibility)

Please send me information on how taxpayers can increase the value of donations

Name

Address

..... Postcode

Telephone.....

Email

Signature Date.....

How did you hear about SGR?

Scientists for Global Responsibility

PO Box 473,

Folkestone,

Kent, CT20 1GS.

Tel: 07 771 883 696

E-mail: info@sgr.org.uk

Web site: <http://www.sgr.org.uk/>

Events

19 - 25 July 2004

Farnborough Arms Fair

Peaceful demonstrations organised by Campaign Against the Arms Trade (CAAT) on 19th and 24th July.

Tel: 020 7281 0297

Email: action@caat.org.uk

Website: <http://www.caat.org.uk/>

21 July 2004

Trends in global fisheries: implication for food security

Public Lecture by Prof. Daniel Pauly of the University of British Columbia, at the Royal Society, 6-9 Carlton House Terrace, London SW1Y 5AG, 6.30pm. Free.

Tel: 020 7451 2500

Website: <http://www.royalsoc.ac.uk/>

6 -10 September 2004

The British Association 2004 Festival of Science

At the University of Exeter. To include a session on "Weapons technology and scientific ethics" organised jointly by the British Pugwash Group and SGR – see p1.

Tel: 020 7019 4941

Website: <http://www.the-ba.net/the-ba/>

If you are attending any of these events, don't forget to take along a few SGR leaflets etc.

Join the SGR Forum email list!

SGR Forum is our internal e-mail list. It is used mainly for news and announcements (of SGR and other events). Forum members also engage in the occasional brief discussion via this channel, for example when a member requests information, advice or help. All SGR members who have internet access are encouraged to join.

To join visit <http://mailman.greenet.org.uk/mailman/listinfo/sgrforum> and following the (very straightforward!) instructions from there.

SGR has another email-list on **Population, Consumption and Values**. For more info, or to join this list, please contact Alan Cottey at [<AlanC@sgr.org.uk>](mailto:AlanC@sgr.org.uk)

This edition of the Newsletter was edited by Patrick Nicholson. The opinions expressed within do not necessarily represent those of SGR.

Please send contributions for the newsletter to [<newsletter@sgr.org.uk>](mailto:newsletter@sgr.org.uk) or the SGR postal address.