



SGR recruits its first Executive Director

Phil Webber summarises important new developments

There have been some very significant and positive developments in SGR over the last few months. As a result, SGR is now at the point where we have an unprecedented opportunity to develop, and hence exert more influence over the agendas that SGR was formed to tackle.

SGR's Development Plan

Many SGR members will remember that back in 2000 we carried out a membership survey and held a special SGR meeting to draw together a plan to transform SGR. The main elements of this were to employ staff, to increase our membership, funding levels and to develop several project areas also supported by paid workers.

We have come a long way since the last newsletter towards these ambitions:

For the first time in our existence we have an Executive Director.

We advertised this (part time) job at the end of January, and by 1st March our successful candidate, Stuart Parkinson, was in post. Most of you will know Stuart already from his former role as Chair and co-ordinator of our ethical careers work. He resigned from this post to enable him to apply, and the National Co-ordinating Committee, led by myself, handled the recruitment. Stuart's background is mainly in climate change and energy issues, but he has worked in a wide range of other areas, most recently for the University of Surrey and then for Friends of the Earth.

Our ability to recruit a Director reflects our recent success in

Weapons of Mass Destruction

SGR Half-Day Conference & SGR AGM

Saturday 13th September

1.30 - 4.30, Friends House, 173
Euston Road, London NW1

Speakers: **Dr Frank Barnaby**
(Oxford Research Group) and
Professor John Finney (British
Pugwash Group/SGR)

Full details and booking
information will be sent to all
members soon.

fundraising for core activities - our thanks are due here to the Polden Puckham Charitable Foundation and generous individual donations. So far we have enough finances to begin development of SGR's programmes of work, but one of Stuart's main tasks will be to secure the further funding. Stuart in his first piece (see next page) in his new role says some more about his key tasks.

Military Influence Project

We have also obtained funding to research the links between science and the military. This project is called 'Understanding the military influence on science' (see p4). This funding - thanks to the Network for Social Change - has allowed us to recruit a research officer to work on this project - further funding will be required to publish and disseminate the work.

We need YOUR help

There are still some very important pieces of the SGR development jigsaw that remain to be put in place. Apart from seeking further funding to top up the grants already achieved, we must recruit more members. I think that this is one of the most practical ways in which members can make a personal contribution to getting SGR into a position where we can have real influence and in the process establish a much more secure financial base.

For further information on how you can help, see p2.

Iraq War

Finally, I was pleased, if that is the right word, to be able to contribute to SGR's opposition to the military action in Iraq. Further details of this can be found on p3.

*Phil Webber is Acting Chair of SGR.
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News from SGR

A few words from the Executive Director..

Stuart Parkinson

I'm very honoured to take up the role of SGR's first Executive Director. SGR plays an important and unique role in its promotion of ethical science and technology and I intend to ensure SGR becomes much more influential among policy-makers, scientists, campaign groups and the public alike.

Overall, my roles will be to improve the co-ordination of SGR's existing research, education and lobbying activities; extend these activities; obtain funding (both through increases in membership and from trusts); and improve SGR's visibility among our target audiences.

One of my main focuses will be to build on the success of SGR's ethical careers work which I have been co-ordinating voluntarily for the last three and a half years. I'm pleased that one of my first duties as Director was

to manage the launch of the first three of a new series of briefings entitled 'Thinking About an Ethical Career in Science Technology' (see p3). These briefings are a follow-up to our introductory booklet on ethical careers, of which over 2800 copies have now been distributed!

One area I'd like to improve is SGR's ability to provide expert advice whether it be to policy-makers, campaign groups, the press or public. To this end we are going to run a trial of a service called an 'Ask an expert scientist'. If you are an expert in your area and you're willing to answer occasional questions from, e.g., the press or public, we'd like to hear from you - see p5 for further details.

I also intend to increase our lobbying activities. While our input has contributed to the appearance of

strong 'climate-friendly' policies in the Government's Energy White Paper (see p5), there is still a lot of work to do in the areas of UK military policy (see p3), genetically-modified crops (see p4), and science policy (see p3).

I'd also like to announce that the SGR conference this year will be on the subject of weapons of mass destruction, and take place on Saturday 13th September in London (see box on p1). Registration details will be sent to you shortly.

And finally, as Phil Webber says above, one of the critical factors in SGR's ability to expand its promotion of ethical science and technology over the coming years will be a larger membership - please convince a friend to join!

<StuartP@sgr.org.uk>

Help recruit new members

Phil Webber

At the present time our membership level (around 650) does not bring in quite enough cash to finance what SGR does. As a result we have long had a somewhat hand-to-mouth existence. If we could recruit another 100 members to start with we would turn this situation around. In two to three years we are aiming for a membership of over 1000.

Please take one of a few simple actions to help us in this. Most of us

are based in universities or have good links, so we are all in a position to know or come into contact with people who are potential members.

- We will shortly be producing a new SGR recruitment leaflet - can you put one up in your workplace?
- Is there a friend that you think you could convince to join SGR?

- Can you advertise the next SGR conference? (see p1)

I want to encourage as many people as possible to help with this (please contact the SGR office if you can) - not only will more members improve SGR's finances, they will also mean that we will have more leverage with policy-makers to put scientific and technological work onto a more ethical path.

This is also the reason why we have increased the membership fee after a long gap. Part of our case for funding to grant-giving bodies was that we would maximise the income via our own membership to make any grants given most effective. So, if you haven't yet renewed your subscription for 2003, you can help by sending in your payment as soon as possible.

<PhilW@sgr.org.uk>

SGR subscription rate change

The National Coordinating Committee has decided on a modest increase in the subscription rates, the first such increase in many years. The increased subscription income will complement grant funding already secured to facilitate the expansion of SGR's membership and activities. New rates are:

£7.50 unwaged (minimum) / £12.50 low waged / £25 waged

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

Thinking About an Ethical Career in Science and Technology

Stuart Parkinson and Vanessa Spedding

Things have been very active in SGR's ethical careers project over the past few months. On March 7th, to coincide with the start of National Science Week, we launched the first three in a new series of 8-page briefings entitled 'Thinking About an Ethical Career in Science and Technology'. Each of these briefings gives an in-depth discussion of an area of science and technology, highlighting the controversies and discussing 'ethical' career options for scientists and engineers. The first three briefings are 'Career Choice and Climate Change', 'Clean Technologies: a Positive Choice', and 'Career Choice, Ethics and Animal Experiments'. Two further briefings, one on sustainability and career choice and the other on the militarisation of space will be published shortly. All briefings are available both on paper from the SGR

office (free to SGR members) and in electronic form from the SGR web-site: <<http://www.sgr.org.uk/ethics.html>> Further briefings to be published later this year or early next year will cover issues including science and the military, nuclear issues, genetics, and science policy.

Many of you will realise that these briefings are a follow-up to the introductory booklet on ethical careers which SGR published in September 2001. We are very pleased to be able to tell you that over 2800 copies of this booklet have now been distributed: to science and engineering students/graduates, to university careers offices, to lecturers and to the public. What's more, many of the copies have gone overseas, and the booklet is even being translated into Korean!

An important way of raising awareness of SGR's work in this area is by attendance at university ethical careers fairs, of which there are a growing number. SGR attended six such fairs during the autumn and spring terms.

We would like to thank all those who have assisted in this project.

Please, if you can, help SGR publicise the ethical careers booklet and briefings, for example by putting a leaflet on your departmental noticeboard or by helping at a careers fair. Contact <ethicsproject@sgr.org.uk> for more information.

Vanessa Spedding and Stuart Parkinson are co-editors of SGR's ethical careers briefings
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<StuartP@sgr.org.uk>

Arms and Arms Control

Phil Webber

Unsurprisingly the Iraq war dominated SGR's work in this area over the past few months. In the run-up to the war, SGR issued press statements condemning the militaristic policies of the US and UK Governments. On the eve of the invasion I spoke at a public meeting in Sheffield on 'America's weapons of mass destruction', which in turn inspired me to draft - with SGR colleagues, especially Vanessa Spedding - a briefing, "Why the War on Iraq is a warning for the Planet". This examined the motivations for the war, especially the expansion of US military and economic power, and discussed the likely consequences and implications of war. The briefing can be obtained from the SGR office or downloaded from SGR's web-site at <http://www.sgr.org.uk/ArmsControl/Iraq_planet_warning.htm>. The briefing was written as the war started and as the invasion progressed. Now, after the "hot" war has ceased some of the points we made about the lack of weapons of mass destruction (WMD)

have been confirmed and the justifications that the UK and US Governments gave look even less convincing. Our concerns about a post invasion Iraq also look depressingly accurate. Anyway see for yourself. In June I expressed the view that the media should be pressing the Government and particularly Tony Blair on lack of WMD. At the time of writing this has become an intense political and media issue due to a combination of briefings from the security services, remarks by Donald Rumsfeld and questions raised in the US administration. It is dangerous to make predictions in the fast moving world of international politics, but Iraq and WMD does seem to have been a crucial turning point for Tony Blair's credibility and influence here and abroad. In my view it now seems clear that there were not and are not any actual "weapons" (i.e. something that could actually have been fired) of mass destruction anywhere in Iraq. So called "mobile laboratories" might

be missile oxidiser recharging facilities - no one seems to know. Having a technical ability to make biological or chemical weapons is very far from having a workable weapons programme. And any evidence must be independently verified to have any credibility.

One piece of good news is that SGR has secured some funding for a one year research project entitled 'Understanding the military influence on science' (see p4). This is an area which has been much neglected in recent years and SGR intends to put this issue on to the political agenda by replacing impressions with hard facts.

SGR has also been lobbying against the UK involvement in the proposed Missile Defence system championed by the Bush Government. Unfortunately, in January the Defence Minister, Geoff Hoon, announced the UK has given permission to the US to include the Fylindales radar base in Yorkshire in the scheme.

Further details of SGR's work in this area can be found on the Arms and Arms Control pages of the SGR website, <<http://www.sgr.org.uk/arms.html>>.

We need help! Any SGR members who could spend any time inputting

into this work area, e.g. commenting on or co-writing papers/ helping make responses to Government consultations, or even keeping an eye on items in the media such as large arms contracts or new developments

on missile defence, please get in touch.

Phil Webber is SGR's Co-ordinator for arms and arms control issues
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Science Policy

Stuart Parkinson

Currently, the main public concern about science policy is over the growing influence that narrow vested interests (especially industry and the military) have over scientific research and technological development. SGR has steadily been increasing its work in this area, in particular with the 'Knowledge: Common heritage not private property' seminar last November (see SGR Newsletter 26).

We now also have two research projects running in this area, one focusing on military interests, and the other focusing more on commercial interests.

The first project is entitled 'Understanding the military influence on science' and is funded by the Network for Social Change. Its main aim is to identify how the research and development budget of the Ministry of Defence (currently in excess of £2,300,000,000 annually) is spent, and how it might be better used to contribute to peace and sustainable development. The project will also look at commercial military funding and, where possible, make international comparisons. We have just recruited Dr Chris Langley as research officer for this project. Chris

has a background in biology and science funding issues.

The other project is being carried out by Dr Jon Goulding, of Imperial College, and is more focused on the influence of large corporations on science and technology. A significant proportion of this work will be concerned with the biotechnology/pharmaceutical industries.

We will report regularly on the progress in these projects.

Stuart Parkinson is Co-ordinator of SGR's science policy work
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GM Issues

Eva Novotny

The main news to report is that the long-neglected GM page on the SGR web site is at last being updated. Patricia Hughes and Ronald Ashri of the web team have been working hard to place on the site the various reports, letters and other items that have been produced during the past few years. The remaining Chardon reports and related material should soon appear.

In January Sir Peter Lacham, who was introduced as the incoming head of the British Medical Association, was interviewed on Radio 4 and gave the usual assurances and claims about GM crops. SGR sent him a letter to refute his statements. The BMA, however, has denied that Sir Peter has, or is foreseen to have, any connection with them.

In February, a letter was sent to Members of the Scottish Parliament urging them to adopt the Organic Targets Bill for Scotland, citing the advantages for soil, biodiversity,

health and economics of organic farming over conventional agriculture.

In March, a letter was sent to Brazilian ministers who were about to decide whether GM crops should be grown in Brazil. Some of the risks, uncertainties and frequent failures of GM crops to deliver their promises were highlighted.

In April, the GM Co-ordinator wrote a personal letter to eight MEPs, urging them to vote for amendments to legislation that would ensure that GM contamination of seeds would be kept as low as can be detected with existing technology at any time. At present, this level is 0.1%, but levels as high as 0.7% have been proposed for legislation.

In May, a new body was launched by the Institute for Science in Society (ISIS) in conjunction with SGR and other organisations, in protest against the platitudes continually being issued about GM foods by the government

and other bodies, including the Royal Society. This new body is the ISP – Independent Science Panel on GM. It consists of scientists who, having no vested interests in promoting GMOs, see clearly the hazards of premature release of GM crops into the environment. SGR's GM Co-ordinator is a member of the Panel. The ISP held a conference in London, which was highly successful. Speakers included prominent figures like David Bellamy, Arpad Pusztai and even the Environment Minister Michael Meacher. The ISP issued a statement that may be found on the ISIS web site <<http://www.isis.org.uk>>.

At the end of May, SGR sent a contribution, on pollen transport by wind, to the Science Debate, one of the three aspects of the National Debate on GM crops.

Eva Novotny is SGR's GM issues Co-ordinator
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Climate Change and Energy

Stuart Parkinson

One of the most significant events of recent months was the release of the UK Government's Energy White Paper stating its policy in this area for coming years. SGR, among other organisations from all sides of the debate, had input its views into the White Paper consultation last autumn. We had argued for the Government to commit to the recommendation of the Royal Commission on Environmental Pollution for the UK to cut its emissions of greenhouse gases by 60% by 2050 (from 1990 levels). We had also argued that such a reduction should be met by major expansion of renewable energy and energy efficiency measures with, if necessary, limited use of carbon capture and geological storage. We argued that nuclear power, for reasons of nuclear weapons proliferation, vulnerability to terrorism, nuclear waste generation and cost, is not a viable option. We are pleased that the

Government endorsed our view on almost all of these issues. Additional investments were announced for renewable energy, with a new aspirational target set for 20% of UK electricity to be generated by these sources by 2020. A decision not to support the building of any new nuclear power stations in the near future was also announced. However, there is still much work to be done to turn the positive commitments and aspirations in this area into firm measures and policies, and a further review of renewable energy policy is expected in 2005. SGR will continue to monitor progress and lobby in this area.

SGR's climate and energy work has also involved the production of the first two of the 'Thinking About an Ethical Career in Science and Technology' briefings: one on climate change and the other on clean technologies (see p3). These provide

some detail on the fast growing prospects for scientists and engineers in these areas.

SGR also continues to give lectures in this area, the most recent being on an MSc course at City University and entitled 'The Science and Politics of Climate Change'.

Further details of SGR's work in this area can be found on the Climate Change and Energy pages of the SGR website <<http://www.sgr.org.uk/climate.html>>. Any SGR members that would like to input into our work in this area, e.g. commenting on or co-writing papers/responses to Government consultations, please get in touch.

Stuart Parkinson is SGR's Co-ordinator for climate change and energy issues
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'Ask an Expert' - a new service from SGR

Stuart Parkinson

SGR is increasingly being approached by environmental/ peace organisations (most recently Friends of the Earth - see article on p7 - and Greenpeace), the press and the public to direct them to independent expert scientists who can answer their technical questions/ provide interviews etc on some aspect of controversial science and technology. While there is a wide knowledge base among the SGR committee and staff, we feel sure we could provide a much better service if we did more to involve the huge expertise of our membership. So, are you an expert on the science, technology, policy or ethics of one of the following?

- Armaments (conventional or weapons of mass destruction)
- Peace & conflict
- Climate change
- Nuclear power
- Renewable energy / energy-efficiency

- Genetically-modified agriculture
- Sustainable agriculture
- Sustainable consumption / lifestyles
- Population
- Science & technology policy (especially the role of vested interests)
- Emerging technologies (including nanotechnology)

If so and can spare a little time for the occasional inquiry, please can you send the following details in an email to me at <StuartP@sgr.org.uk> (with 'Ask an expert' in the message title) or by post to the SGR office.

1. Name
2. Institution/ Organisation
3. Contact details (address, email, telephone - which will of course be kept confidential)
4. Area(s) of expertise
5. Qualifications/ degree of experience

6. What is the maximum frequency of inquiries you are willing to deal with? (e.g. once a month - obviously some inquiries will be more time-consuming than others, so we will adjust accordingly)

7. Are you willing to speak on behalf of SGR from time to time? (we will contact you separately about this)

While it's probably obvious, we should just add that although you will be giving an individual opinion, we will still expect your comments to be broadly consistent with SGR's aim of promoting ethical science and technology (see <<http://www.sgr.org.uk/Constitution.html>>). We should also make it clear that anyone volunteering for the service will be expected to declare any relevant interests/affiliations.

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Does anybody remember the Nuclear Winter?

Stuart Parkinson looks into why the climatic disaster which would follow a potential nuclear war has been forgotten

During the 1980s, one of the major concerns of the effects of a potential nuclear war was the possibility of it causing a 'nuclear winter' - a catastrophic change in climate caused by the ejection of massive amounts of dust and smoke into the atmosphere during the course of such a war. Yet, since the end of the Cold War in 1989, discussion of the potential for major climatic changes due to a nuclear conflict has virtually ceased - despite the fact the large arsenals of nuclear weapons still remain on alert status, and hence such a conflict could still happen by accident. And of course, recent tensions, in particular between India and Pakistan, could still lead to an intentional nuclear war.

The devastation of a nuclear winter

Obviously, when a nuclear bomb hits a target, it causes a massive amount of devastation, with the heat, blast and radiation killing tens or hundreds of thousands of people instantly and causing huge damage to infrastructure. But in addition to this, a nuclear explosion throws up massive amounts of dust and smoke. For example, a large nuclear bomb bursting at ground level would throw up about a million tonnes of dust.

As a consequence of a nuclear war, then, the dust and the smoke produced would block out a large fraction of the sunlight and the sun's heat from the earth's surface, so it would quickly become be dark and cold - temperatures would drop by something in the region of 10-20°C - many places would feel like they were in an arctic winter. It would take months for the sunlight to get back to near normal. The drop in light and temperature would quickly kill crops and other plant and animal life while humans, already suffering from the direct effects of the war, would be vulnerable to malnutrition and disease on a massive scale.

In the case of an (e.g.) accidental nuclear exchange between the USA and Russia, the main effects would be felt in the northern hemisphere, as the dust and smoke would quickly

circulate across this area. But even in this case, it would soon affect the tropics - where crops and other plant/animal life are especially sensitive to cold. Hence, even in these areas there would be major problems.

While the temperature at the surface would be low, the temperature of the upper part of the troposphere (5-11 km) would rise because of sunlight absorbed by the smoke, so there would be a huge temperature inversion. That would keep many other pollutants produced by widespread fires (e.g. dioxins, PCBs, sulphurous gases) down at the levels people breathe, making a very dense and highly toxic smog.

One further environmental problem would be widespread destruction of the ozone layer caused by high levels of nitrogen oxides. The average loss of ozone could be as much as 70% - much higher than that currently cause by CFCs. So after several months when the smoke cleared and the sun began to shine again, there would be a large increase of UV radiation reaching the earth's surface. This would be bad for humans (e.g. eye and skin damage), but the major effect would be for other living things, notably sensitive plankton, which are at the bottom layer of the whole marine food chain. Animals would also suffer - blindness would be common - and blind animals would quickly starve.

Altogether, nuclear winter would be an ecological disaster of a similar magnitude to the major extinctions of the past, such as that at the end of the Cretaceous period 65 million years ago when 75% of all species died out, including the dinosaurs. An added factor after a nuclear war would be radioactive contamination giving worldwide background radiation doses many times larger than has ever happened during the 3 billion years of evolution.

The research on nuclear winter

The prediction of nuclear winter was first published by a group headed by

Carl Sagan in 1983 (TTAPS, 1983). The research group became known as 'TTAPS', after the initials of the five scientists involved. A number of other studies were published in the next few years, including major reports by The Swedish Academy of Sciences, and SCOPE (Scientific Committee on Problems of the Environment), and the U.S. National Research Council (NRC, 1985).

Throughout this period, many attempts were made by government and military scientists to play down the possible consequences. They argued that the effects would not be nearly so severe, and began talking of a 'nuclear autumn'.

In 1990 the TTAPS group decided to publish a further paper (TTAPS, 1990), in which they reviewed in detail the later studies, and made some modifications to their 1983 results. Some of these were in the direction of more severe changes, others towards milder changes. But overall the general picture was little changed. One very notable conclusion that was reiterated from the 1983 study was that if oil refineries were the main targets, only 100 bombs would be enough to cause a nuclear winter.

Sagan and Turco (one of the 'T's) followed up their second paper by publishing a book: "The Path Where No Man Thought". This gives an account of current conclusions for the serious non-specialist reader. It gives detailed descriptions of nuclear winters of different severity according to how many weapons were used, and against what targets.

Recent history

Since 1990, as far as we can ascertain, no new research has been carried out into the possible climatic effects of a nuclear conflict. Yet since 1990, major improvements to climate system models have occurred in the international scientific effort to understand human-induced Climate Change. Meanwhile, even though the threat of a large-scale nuclear conflict

between the USA and Russia has diminished, the threat of a smaller scale nuclear conflict has perhaps increased, for example due to increasing tensions between India and Pakistan over Kashmir.

So now seems an especially appropriate time to do further research on the climatic effects of a nuclear war. But worryingly no one is doing it. Steven Starr and Dr Neil Arya of the Canadian organisation, Physicians for Global Survival, have been trying to encourage former members of the TTAPS team to update their work, as well other scientists in the area. SGR has also contacted climate modellers in the UK to see if we can find anyone who might be interested. So far neither PGS nor SGR have had any

luck. Is this subject just too controversial for climate scientists to risk getting involved in? Will no one stick their neck out for such an important piece of work?

If any SGR members have contact with climate modellers who might be willing to work on this issue, we would be very interested to hear from you!

With thanks to Steven Starr for assistance with this article.

<StuartP@sgr.org.uk>

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Nuclear Waste

Rachel Western asks whether those in the nuclear industry know what they're doing, and whether you'd like to get involved in keeping an eye on them

In Britain we have loads of nuclear waste that we don't quite know what to do with. The conventional thinking was that it should be buried, but in the mid nineties a burial plan based at Sellafield in Cumbria was rejected, partly because the science of the plan wasn't adequately developed.

Now, nearly ten years later, the Government is having a fresh look at what is the best approach to take. One of the key organisations involved is Nirex (Nuclear Industry Radioactive Waste Executive), who have been the main proponents of burial. They want people to take a look at today's evidence for burial and see what they think of it. I am working with them to try to broaden the range of people keeping an eye on their work to see if it adds up to a programme that we can move forward with. The plans are very tentative at the moment, but if you would like to get involved I would love to hear from you.

I am the Nuclear Researcher at Friends of the Earth and I am also a research associate at Lancaster University. Through Lancaster I am contracted to Nirex to develop a more broadly-based critique of their science. The two main disciplines are chemistry and geology (especially

hydrogeology), though biology is also important.

In an underground nuclear waste repository, radioactive waste would dissolve in ground water and be carried back up to the surface by the underground water system. Back in the living environment it could be taken up by living creatures which could then be damaged by the radioactivity. The key problem that Nirex face is that the natural world is much more complex than the computer based techniques that they use to calculate the possible harm can cope with. That means that in addition to the specific technical questions there are also problems that arise from the averaging techniques that Nirex use.

We haven't yet worked out what being involved with the project would specifically entail - it would largely be up to how interesting you found it. Certainly at this stage the involvement would be voluntary. I did my PhD on the Nirex safety assessment research and developed Friends of the Earth's case at the Nirex Public Inquiry in 1995 which rejected the Sellafield plan. At the moment I am trying to develop an overview of the research reports and pull out a couple of key topics that we can look at.

Nirex are based at Harwell near Didcot in Oxfordshire and there may be seminars there (for which expenses would be paid) and we may organise a field trip. It's all early days yet in the project, and I would love to hear from people who would like to get involved.

Instead of burying waste it might be better to keep it above ground where it would be easier to keep an eye on it and fix any problems that arose. However, this long term storage option carries its own problems and the best approach to take is not yet obvious. I believe that we should not rush ahead carelessly and that we need to develop a responsible programme at the right pace and with enough care.

If you would like to get in touch with me about the possibility of getting involved with checking out the Nirex research programme, please leave a message for me at:

rachel.western@nirex.co.uk

Nirex, Curie Avenue, Harwell, Didcot, Oxfordshire, OX11 0RH,

Tel. 01235 825 500

Strategic viewpoints of responsible American scientists

John Moore provides an update on the activities of scientists in the US

SGR Newsletter readers may be interested in the activities of our sister organisation, the Federation of American Scientists (FAS), as proclaimed in its bimonthly Public Interest Report (PIR).

Since George W Bush came to the White House at the beginning of 2001, and particularly since 11 September 2001, it has seemed that the Atlantic has been widening and the global perspective of Americans and Europeans has been diverging. Many US citizens seem to see the outside world as hostile. The American administration has garnered support for seeking to arm the nation to the teeth for any occasion when it chooses to face this outside world; and, when it, frequently, chooses not to face the outside world, many Americans seem content to withdraw into “fortress America” behind a missile defence shield.

So, it might be expected that the FAS might have a different view from SGR of the priorities for “globally-responsible” scientists. Happily a reading of the FAS’s Public Interest Report for the last 2 years reveals this not to have been the case

The FAS has been consistently critical of President Bush’s missile defence policy throughout this period. Technically, it won’t work, and would almost certainly trigger dangerous counter reaction from friends and foes of the US alike. The “rogue states” that a missile defence system is designed to counter, such as Iran or North Korea, should not be facetiously dismissed as part of an “axis of evil”. Rather, Washington should pursue with these states a tough diplomatic engagement. In other words, any supposed threat should be dealt with politically rather than militarily. In November 2001, the FAS held a press conference when it released the text of a letter from 50 American Nobel laureates to leaders of the US Congress. To quote one sentence:

The tragic events of September 11 eliminated any doubt that America faces security needs far more substantial than a technically

improbably defense against a strategically improbable Third World ballistic missile attack.

The FAS has been as critical as informed European opinion of Washington’s unilateralist withdrawal from the Anti-Ballistic Missile treaty and refusal to support a protocol to the Biological Weapons Convention that would help to verify compliance – this despite FAS lobbying and testifying to Congress. By provoking the development of nuclear weapons by other countries, President Bush’s encouragement of the development of “clean bunker-busting mini-nukes” threatens other arms control agreements, the Non-Proliferation Treaty (NPT) and the Comprehensive Test Ban Treaty (CTBT). A detailed piece in the first issue of the Public Interest Report for 2001 argued that the development of “mini-nukes” has been the result of special pleading by the weapons laboratories, such as Los Alamos. The article argued that radioactive fallout from the use of such weapons could not be contained, i.e. the weapons would not be “clean”. The article concluded:

Attempts to develop a new generation of low-yield nuclear weapons would only make nuclear war more likely, and they seem cynically designed to provide legitimacy to nuclear testing – steps that would return us to the dangers of Cold War nuclear competition, but with a larger number of nations participating.

As argued in the PIR, the US administration’s Nuclear Posture Review and the subsequently-agreed US-Russian Strategic Offensive Arms Reduction Treaty (SORT) were both deeply-flawed documents. The FAS has been urging that the problem of the proliferation of weapons of mass destruction, including to terrorist organisations, should be tackled at source. Following a thorough study under the FAS Strategic Security Project, the FAS helped to persuade Congress to provide funding for greater security and control over fissile material in the former Soviet Union. The Bush administration had initially sought to reduce this funding.

The FAS Biological Weapons Working Group has backed the development of educational programmes for students in the biological sciences to make them aware of and be able to identify possible misuse of biological technology; so that such future scientists could, if necessary, become whistle-blowers.

When Los Alamos scientist Wen Ho Lee was prosecuted, in the year 2000, on charges of mishandling classified information, FAS was concerned enough about the issues raised of government secrecy to publish the court evidence on its website. An officially-commissioned report stated that “[t]he current negative climate is incompatible with the performance of good science”. Lee was manacled and put in solitary confinement, but then later freed from jail with an apology from the judge. In congressional testimony, the FAS had urged that “the security apparatus be returned to a subordinate position in which it serves, but does not dominate, the national interest”. Subsequently the FBI and Justice Department mishandling of the case has been strongly attacked by congressional and government aides – and by the FAS.

And, finally, what has been the direct response of the FAS to the events of September 11, 2001? No knee-jerk hysterical response. No pressing for the US to rearm itself with ever-more sophisticated weaponry to avenge the attacks on New York and Washington. No. Instead the FAS was again pressing for the problems to be tackled at source. If there was the possibility of terrorists gaining possession of weapons of mass destruction, there should be tightened control over weapons-grade fissile material. In response to the anthrax scare, the FAS worked with US Senators in successfully preparing legislation that would require all laboratories working with listed biological agents to register with the Department of Health and Human Services. The FAS Chemical and Biological Arms Control Project

initiated a programme to provide information and training to emergency services personnel. Topics addressed included identifying symptoms, recommending treatments, safety procedure and methods for identifying and isolating contaminated sites. Responding to concern about the possibility of a terrorist attack using a radiological weapon (or "dirty bomb"), FAS President Henry Kelly

testified before the Senate Foreign Relations Committee. Kelly's written testimony presented a detailed analysis by FAS staff members of the contamination effects of such attacks. FAS recommended there should be less access to radioactive material, better use of detection techniques, better training of emergency service personnel and research into the

cleaning up of radiologically-contaminated sites.

John Moore is Lecturer in Mathematics at Leeds College of Technology

Information about the FAS and its programmes can be obtained from its website <<http://www.fas.org>>

Conference Reviews

Gene Futures: debating the use of GM crops and foods in the UK

**Royal Society of Arts, London, 11
February 2003**

**Organised by GeneWatch UK, with
Five Year Freeze, Elm Farm
Research Centre, Unilever and The
Guardian as partners**

There was a distinguished cast of speakers. Environment Minister Michael Meacher gave the keynote introductory speech. He said that the government is keen to take the steps needed for a constructive and informed debate on GM crops, that they regard the debate as an opportunity to find out what people really think, and that they believe that consumers should be able to make informed choices about what they eat.

Professor Barry Commoner opened 'How well can science predict GM impacts?' with the remark that ' Frankenfoods' is a term that has been dropped from public discourse, yet "I have news .. the Frankenfoods exist ... but they are hidden in laboratories." His point was that 90% to 99% of 'successful' events (i.e., gene implantations) were abnormal.

Much of the day's proceedings had the format Presentation-Response, and the response to Barry Commoner was given by Professor Janet Bainbridge, chair of the Advisory Committee on Novel Foods and Processes. She was one of several speakers during the day who emphasised just how far the use of GM crops has already come - 53 million hectares worldwide under

transgenic crops in 2001. Concerning openness, she said that ACNFP published full minutes and details of submissions on its website and she was saddened by the small number of comments from outsiders. She did not however (I'm pretty sure I didn't miss it) give us the URL. It is <<http://www.foodstandards.gov.uk/science/ouradvisors/novelfood/>>.

The next Presentation-Response pair did not provide the expected contrast. Brian Johnson of English Nature, speaking on 'GM crops: enhancing or degrading the environment?' was described by a commenter from the floor as having done Professor Moses' work for him. And this assessment was echoed by Responder Vivian Moses, of CropGen, himself and by others from the floor.

Bernard Marantelli, recently resigned from Monsanto (cheers from audience) and starting soon with Syngenta (gasps), on 'The importance of GM crops for agriculture' made numerous large claims for the improvement of yields from GM crops, after which Suman Sahai from the floor contested his claims in respect of Bt cotton in India. The main point made by the formal responder, Lawrence Woodward, of the Elm Farm Research Centre, was that research into non-GM ways of increasing crops yields and reducing environmental impacts were being impeded because nearly all the research funds were going to GM.

Christine Drury, of Unilever, on 'Providing choice in a global market' described market research as finding out what the consumer wants. I noted that there was no mention of creating consumer desires. Responder Deanna Ayala, Agricultural Attache at the US

Embassy, defended the US position of non-labelling of GM foods, quoting the Food and Drug Administration - "biotechnology derived food need not, indeed *should* not, be labeled as different if there is no nutritional difference ..."

The day's keynote presentation was on 'GM crops and global food security' by Dr Suman Suhai, of GeneCampaign, India. She gave an overview of the ways in which the present spectrum of GM crops, and the biotech companies' conditions of use, are not in the interest of developing countries.

The final session of the day was 'Four presentations to open the debate on whether or under what conditions commercialisation of GM crops should take place in the UK'. The speakers were - Tony Juniper, of Friends of the Earth, on 'A GM free UK'; Ben Gill, of the National Farmers Union, on 'Agricultural management for coexistence'; David Baulcombe, of the Sainsbury Laboratory, on 'Science and agriculture in the UK'; and Sue Davies, of the Consumers' Association, on 'Protecting consumer choice'. It had been intended that there should be a significant amount of time following these presentations for this debate to start at the meeting, with comments from the floor, but an accumulated time overrun - the day's programme was always an ambitious one - meant that these contributions were made under time pressure. A notable topic during this brief discussion was vigorous insistence that Ben Gill say who was to pay for the coexistence between GM and non-GM farmers and the answer squeezed out eventually was - the non-GM farmers.

After all the presentations and the hurried debate, science writer Colin Tudge presented Closing Remarks. Apologising, with tongue in cheek, for not being able to summarise what had been said by so many speakers, he declared that he would editorialise like mad. In fact, his announced brief gave him a perfect right to do what he did, which was to give a large part of his time to addressing some important questions that had hardly been mentioned by the invited speakers. He remarked the huge gap between what clever and nice people say and the actions of those who run the world - corporations. His take on the US and UK governments was that they operate as if their task is to make things easy for corporations. These remarks were warmly appreciated by the audience.

Many of the presentations can be found on the Genewatch UK website, <<http://www.genewatch.org>>, along with links to press articles about the conference. There is a 'GM Debate' page too.

No doubt the debate will continue for some while. I found the Gene Futures meeting to be a useful contribution in its own right and a good basis for further discussion.

Alan Cottey

Black Sky Thinking Seminar

The Royal Society, London 8 April 2003

Black Sky Thinking is a Demos project exploring the value of space science since the sixties and seventies heyday of manned spaceflight. The project enjoys the support of UK space organisations: Astrium; British National Space Centre; Particle Physics and Astronomy Research Council, and others.

The last of three seminars on themes of marketisation, management, and socialisation of Space will be held at the Science Museum on June 3rd. Seminar panellists have included Lord Sainsbury and Sir Martin Rees.

I attended the second seminar on the social potential of Space held at the Royal Society on April 8th, wearing a Scientists for Global Responsibility lapel badge. As a longstanding but non-scientific member of SGR, this does make me feel a bit of an impostor. But Tom Bentley, Director of Demos, recognised that new networks of communication were enabling non-experts to learn, understand, and problem-solve. Even

NASA were consulting groups of amateur scientists. Marina Benjamin, author of *Rocket Dreams*, in an amusing rejoinder, likened NASA to a boa constrictor in its ability to embrace, kindle, and then kill initiatives.

Martin Rees, Astronomer Royal, agreed that the amateur science community, a product of the world wide web, was part of Space democratisation, important if young people were to be enthused.

Demos' themes of enterprise and quality of life - redefining life sciences; the pursuit of holistic and high quasi-spiritual ideals represented by Space - combined with practical applications of technology, were not dissimilar to subject matter in SGR's recent discussions on knowledge and inquiry.

The findings of Black Sky Thinking will be published in the autumn

For more information about the project tel. 020 7401 5346 or visit the Demos website at <<http://www.demos.co.uk>>

Michael Weller

Book Reviews

Agri-Culture: Reconnecting People, Land and Nature

Jules Pretty

**Earthscan, 2002, 280pp, £14.95
(ISBN 1-85383-925-6)**

<<http://www.earthscan.co.uk>>

How embarrassing. I watched Professor Pretty give a seminar at a small workshop this year and when introduced to him afterwards made a quip, "I really enjoyed your presentation but found it a little anthropocentric for my tastes". Out of curiosity I bought his latest book and by the time I had reached page 7 I had scrawled 2 pages of notes and was intent on devouring the rest of it. This

is a wonderful book - essential reading for anyone involved in conservation or simply interested in the ways in which people and society relate to their world.

Pretty's main thrust is that the separation of humankind from nature and the land must be reversed if our use of renewable resources is to become sustainable. Recent technical and agricultural progress has been the result of science assuming the leading role - so much so that we can apparently only learn through a process of induction and deduction. In their arrogance scientists have often discarded local knowledge and skills accumulated through experience as irrelevant. How ironic that today's agricultural companies steal the identity of crops developed over thousands of years by the poor and repackage some of their

characteristics as GM products for resale to the same people. On the GM question Pretty points out that both antagonists and protagonists have a tendency to try and apply blanket ideology and advocates a more balanced, case-by-case, cautious and evidential-biased approach. He points out that a continuing dismissive attitude, on both sides, is unlikely to lead to a constructive outcome.

Garrett Hardin pointed out that for society to change there is a need for a fundamental extension of morality, i.e. unless we can get rid of greed, common resources (e.g. pastures, fishing grounds, the right to reproduce and genetic identity) will always be over-exploited. Unfortunately we can't get rid of greed, but perhaps if we follow Pretty's train of thought and look to strengthen embedded rules, rather than enforce new ones

and to search for ways to value, or assign values to, priceless un-ownable resources there may be hope.

Agri-Culture is optimistic, well crafted and peppered with alternately interesting and shocking facts, skilfully woven together with a string of stories and metaphors. This book isn't 'food for thought' it's a veritable banquet!

Magnus Johnson

Weapons of Mass Destruction: Rhetoric and Realities

Ronald Higgins

International Security Information Service (ISIS) Policy Paper 85, December 2002, 8pp

<<http://www.isisuk.demon.co.uk>>

Many years ago, Ronald Higgins' book 'The Seventh Enemy: the human factor in the global crisis' made a deep impression on me. After discussing six enemies of human progress and indeed survival which could be described as external, objective threats, Higgins concentrates on a seventh, fatalism, which prevents us from addressing adequately the first six. (Incidentally, like many of the books which - in my opinion - are of greatest long-term use, The Seventh Enemy is now quite hard to find, even in libraries.) I was glad of the opportunity of reading and reviewing this new pamphlet by Higgins. As the title already indicates, the dichotomy of the outer, objective world (realities) and the inner, subjective world of special pleading and self-deception is the focus of the author's analysis of current discourse on WDM.

I say 'current', but in the torrential flow Higgins' pamphlet is already a historical document, in that it was written during the political build-up to the war on Iraq and was part of the efforts by many far-sighted people to forestall that attack. I consider however that, like 'The Seventh Enemy', 'Weapons of Mass Destruction: Rhetoric and Realities' is of enduring significance. Higgins criticises "loose and sometimes extravagant statements in relation to weapons of mass destruction" which may alarm public opinion and result in

unwise policy making. The main part of the pamphlet comprises twenty short sections which bring much-needed clarification to various concepts and topics. Examples of these are 'WDM as a single category?', 'Mass Destruction', 'Weapons or Devices', 'Tyrannies and Democracies', 'Plans to Use WDM?', 'Zero Tolerance and Material Breach', 'Mass Destruction: Active and Passive'.

As I have already intimated, this pamphlet - a snapshot taken at a unique time, the end of 2002 - is of historical interest but in addition its analysis - unpicking knots which entangle most of us - remains useful and will do so for many years to come.

Alan Cottey

Genetic Technology - Informing the Public

Animal Organs for Humans: The Science and Ethics of Xenotransplantation (Briefing Number 19) June 2002

Animal Cloning: Industrialising Animals? (Briefing Number 20) August 2002

Genetic Modification: The need for special regulation (Briefing Number 21) January 2003

Genetic Technologies: A Review of Developments in 2002 (Briefing Number 22) February 2003

Each £2.50 (£3.50 Overseas) from: GeneWatch UK, The Mill House, Manchester Road, Tideswell, Buxton, Derbyshire, SK17 8LN. Also available online in pdf format from <<http://www.genewatch.org>>

The aims of GeneWatch UK, a not-for-profit public interest group, are "to ensure that genetic technologies are developed and used in the public interest and in a way which promotes human health, protects the environment and respects human rights and the interests of animals," to increase public understanding of genetic technologies and to ensure public involvement in decisions about if or how genetic technologies are used.

For the public to be engaged in decisions about genetic technologies they must be informed and it is this service which GeneWatch performs so admirably. Since its founding in 1998 it has published well over 20 highly readable and informative briefings - the last four of which are reviewed here. Through their website and periodic briefings (available both in hard copy and electronically through their website), GeneWatch makes the information available. In October 2000 Nature said that GeneWatch "stands out among sites opposed to agricultural biotech thanks to the sheer amount of data that it makes available reasonably quickly and easily. ...It makes no pretence to be even-handed, but it is very thorough...."

The briefings are generally 8 page summaries of the basic technology and key ethical issues it raises. The exceptions are the annual Reviews of developments, e.g., Briefing 22. The first briefing was published in March 1998 (Genetically Modified Foods: Will labelling provide a choice) and the first annual review (Briefing Number 5), was published in January 1999. The briefings are very well researched and documented - drawing heavily on the scientific literature and reports of industry.

Briefing Number 19, **Animal Organs for Humans**, was adapted from their 100 page GeneWatch report Genetically Modified and Cloned Animals. All in a Good Cause? It discusses the need for new organs, how scientists are trying to genetically engineer animals to provide them and their success rate (pretty poor despite the hype). The ethical issues include possibility of introducing new diseases and the threat to animal welfare. A list of companies involved in xenotransplantation is provided as is a list of alternative solutions to the need for animal organs.

Briefing Number 20, **Animal Cloning**, surveys the various reasons for cloning animals (from pharmaceutical production to pet replacement) and lists the companies involved in animal cloning. The ethical problems range from the enormous suffering of animals involved in cloning experiments to the dangerous narrowing of the gene pool, and the possible applications to

humans, if the technology does succeed.

Briefing Number 21, **Genetic Modification: The need for special regulation**, argues that for technical, social, cultural and economic reasons the genetic modification (GM) of plants and animals needs special regulation. It is a new technology and the effects are unknown - how to evaluate the safety of GM organisms is still not clear. Socially, GM is leading to the monopolisation of genes and genetic technologies and the consolidation of agrochemical companies and the seed market. This leaves food production at the mercy of a few multinational companies, posing a particular danger for developing nations. The drive to capitalise quickly on genetic technology means that its risks are not being adequately assessed. The Briefing makes a number of clear recommendations about what regulations are needed to avert the problems highlighted in its discussion.

More than half of Briefing Number 22, **Genetic Technologies: A Review of Developments in 2002** is concerned with the debate over the growing of GM crops in the UK, the rest being focused on human genetics. The Briefing begins with a summary of world-wide cultivation of GM crops, moves on to the European regulations of GM crops, but devotes most of its attention to scientific research on the environmental impacts of GM crops - some of which are rather serious, such as the fact that weed oilseed rape in Canada that is resistant to up to three herbicides is becoming common. The Briefing then discusses human genetics. It expresses concern about the unregulated sale of commercial genetic tests, both for their accuracy and for their social implications; it addresses the issues of sex selection, cloning and designing of babies; and it questions the wisdom of the UK Biobank.

In summary, these briefings and the others produced by GeneWatch, available in hard copy and on their website, provide an invaluable source of information on the ethical and social issues that are being created by the rapid development of GM technology.

Richard Jennings

The Final Frontier: America, Science and Terror

Dominick Jenkins

Verso, 2002, 320pp, £19 (ISBN 1-85984-682-3)

<<http://www.versobooks.com>>

As the USA now considers the next step in its 'War on Terror', and uses this to justify increasingly close collaboration between the military and scientists on the one hand, and increasing erosion of US constitutional rights on the other (e.g. new anti-terrorist laws), this is a good time to look for historical parallels. And this is what Dominick Jenkins has done in 'The Final Frontier'.

The book focuses on the US in the period running up to, during and shortly after World War I (WWI). In particular, it highlights the US role in the development of Chemical Weapons (CW), and its attempts to justify this by arguing they are necessary to defend against 'outlaw' states (especially in this case Germany) in order to make a 'world safe for democracy'.

Jenkins has drawn on an impressive range of source material, including scientific journals, military records and government papers, to highlight the collusion between factions within the military, Government, big business and the scientific establishment.

The book begins by describing the ways in which CW advocates (including some scientists) sought to spread fear amongst the US public of the possibility of a German CW attack from the air following the end of WWI. The immense impracticalities of such an attack, e.g. due to the barrier of the Atlantic Ocean, were ignored, as was the fact that Germany had had its arms industry (especially CW production) dismantled under the Treaty of Versailles.

Jenkins then highlights how CW advocates used an 'us and them' argument to justify the US (being civilised) needing to have CWs to battle against uncivilised or 'outlaw'

nations. They further argued that perhaps, in their hands, CWs were humane weapons because they only killed a relatively small percentage of those exposed to them! (This of course ignored long-term health damage, and the indiscriminate nature of their use etc.)

Jenkins follows this by outlining the process through which Germany, whom the US had admired during pre-WWI years (especially the way in which it was using science and technology to support rapid industrial development) transformed its view during the war, and began labelling Germany an 'outlaw' nation.

The parallels between the above situation with Germany and the recent situation with Iraq are quite clear. The US initially supported the Saddam Hussein regime, holding it up as a positive example where dangerous Islamic fundamentalism had not taken hold, despite clear signs of its militaristic policies. But when Iraq invaded Kuwait, the US quickly rebranded the regime as an enemy of democracy. Then, most vocally in the run up to the recent war, the US sought to highlight that there existed a military threat to the US from Iraq, through the use of terrorism and weapons of mass destruction (WMD) - the evidence for which was decidedly suspect. The final parallel is, of course, the 'us and them' argument that we are civilised and can be trusted with, in particular, nuclear weapons while others are not.

The next part of the book discusses in depth how the US 'elite' sought to increase its power by arguing for the need to spread democracy (or rather the liberal capitalist version of it) throughout the world, by force if necessary. Meanwhile it continued to deny basic rights to black and other minorities at home.

The final part of the book focuses on the way scientists and technologists have, by building alliances with various powerful groups in society, strengthened their own position. By use of the arguments that science is a search for truth and that technological progress is generally positive for society - and hence both are politically neutral - scientists and technologists have conversely made themselves more politically powerful. However,

Jenkins challenges the perception that science and technology are neutral. As evidence, he highlights the alliances that grew up during and after WWI between chemistry scientists, the chemical industry, and CW advocates in the military in pursuit of a particular R&D agenda. To strengthen their position, they linked up with the fledgling aircraft industry (both civil and military), police and security forces (who were interested in gases for riot control), colonists (who were interested in CW for controlling uncivilised 'natives'), and agriculturalists (who were interested in chemical pesticides). Jenkins compares this with collaboration between nuclear weapons advocates in the military and some nuclear scientists.

Jenkins concludes with a call to scientists to recognise their role in the misuse of science and technology and to challenge it. He argues that scientists can often see, early on, when science can be used for destructive purposes, e.g. nuclear physics (see below for more detail). He argues that they should speak out at this stage and try to redirect research. He argues they should challenge the growing role of big business in science, and finally he argues that scientists should build alliances with groups in civil society, especially disarmament workers, to encourage more positive use of science and technology.

Obviously the book has much that would appeal to SGR members, and echoes many of our concerns/aims. It also contains some excellent stories well worth repeating. For example, US chemical companies were able to expand massively during WWI by supplying explosives and chemical weapons to the Allies. Du Pont was one of the biggest, its profits rising from \$27 million in 1913 to \$329 million in 1918. With the accompanying expansion of their number of employees (both scientists and non-scientists), they were in a powerful position to argue for the continuation of CW production. The book also draws important parallels between the arguments used by CW advocates post-WWI and nuclear weapons advocates post-WWII and post-Cold War, highlighting the role some scientists had in undermining certain nuclear treaties (e.g. the Non-

Proliferation Treaty and the Comprehensive Test Ban Treaty). Another very relevant tale is of the hopes and fears of early nuclear scientists. Rutherford, for example, had noticed as early as 1903 that the large amount of energy released during radioactive decay might one day be harnessed as the basis of an explosive.

However, the book does have a number of drawbacks. It is rather long (~140,000 words) and written in academic, social science style. Unfortunately this is likely to put off many physical scientists and peace campaigners, who I feel should be the main readers of such a book. The book is also a little disjointed. In some areas (e.g. the arguments used by CW advocates to further their cause), it goes into meticulous detail. But other sometimes closely related areas get little attention. For example, while CW disarmament is raised as an issue, there is no real discussion about how or what was achieved - the 1925 Geneva Protocol banning the use of CWs is not even mentioned! The book also discusses, in great depth, the 'elite' argument that their WMD were making the 'world safe for democracy' - but there was no real discussion of what alternative strategies should be followed. A further problem is that the reader is expected to be familiar with late 19th century/early 20th century world history - if they're not, they will find parts of the book hard to follow.

Overall, this book is one which I recommend SGR members to dip into. For example, Chapter 1 is an interesting discussion of the arguments used by CW advocates to further their cause. Chapter 11 describes the way CW advocates built alliances with other scientists/industrialists etc to further their aims. Chapter 14 is a good summary of the lessons Jenkins draws for today's scientists. The whole, however, is only likely to be read by scholars interested in detailed political history.

Stuart Parkinson

Missile Defence and the Weaponisation of Space

Rebecca Johnson

ISIS Policy Paper on Ballistic Missile Defence, No. 11, January 2003, 12 pp

<http://www.isisuk.demon.co.uk>

Rebecca Johnson was the Executive Director of the Acronym Institute for Disarmament Diplomacy until December 2002 and is currently Director of the Disarmament and Arms Control Programme at the Liu Institute for Global Issues, University of British Columbia.

During the Cold War the US and Soviet Union developed space based systems to support ground based weaponry (war fighting capability) but by treaty avoided developing anti satellite weapons and space based weapons capable of attacking terrestrial targets. In recent years the US administration has begun to consider the development of space based weapons in the context, ostensibly, of ballistic missile defence and also in the defence of space based commercial and military assets (which are becoming less and less distinguishable).

Rebecca Johnson's paper "considers the real, probable and potential threats and risks to the security of existing and future space assets, and examines the arguments for and against the weaponisation of space".

The paper outlines the principle commercial and current military uses of Space (of which the US has responsibility for 95%). Potential space weapons are then discussed with a critical examination of the reasons advanced for their development.

The history of space related treaties is outlined together with more recent diplomatic initiatives in assuring space security. The paper identifies real current threats to space assets and argues that a comprehensive space security regime can only be obtained through international agreement to a treaty in which: the testing, deployment and use of all kinds of weapons in space is banned, testing deployment and use of terrestrially

based anti satellite weapons is banned, and a code of conduct for peace-supporting, non-aggressive uses of space is included. A more constructive role for Britain is indicated and urged.

The paper is clear, authoritative and provides appropriate references.

At the time of writing the Royal United Services Institute is advertising a conference on "The Impact of Space on Military Operations". The impact of military operations on space is sadly absent as a programme topic and should perhaps be of concern to SGR and in particular the astronomy community.

Paul McDonald

Space Use and Ethics, Volume 1

Edited by W. Bender, R. Hagen, M. Kalinowski and J. Scheffran

Agenda Verlag, 2001, 303 pp., E 21.00

This is an important and, as far as I am aware, unique contribution to any debate on how and why we should develop space technology. It is widely recognised that space can be used for the benefit of humankind and to help us embark upon some of the fundamental questions about life the universe and everything. However, the same technology is of increasing importance to the war fighter and is rapidly becoming a key component in the ultimate in globalisation plans – political control and military dominance of the entire planet. This book's distinctiveness is in its consideration of the ethical questions associated with extending the use of a technology that can be applied to constructive or destructive pursuits.

The articles in the book are informative, with useful descriptions of the associated technology and its development that are understandable to non scientists. It also poses and tackles the associated ethical questions. Most of the articles were presented at an international conference of (mostly) German scientists and engineers on "Space Use and Ethics. Criteria for the Assessment of Future Space Projects" held in Dortmund in March 1999,

although some papers were updated in early 2000.

It is well accepted that political and military decisions play an important role in the instigation and continuing development of a country's space programme. More and more countries are now developing the ability to participate in this arena for commercial reasons – especially those well suited for launching communications satellites into geostationary orbits. Many of the authors discuss in some detail the plans that the Pentagon has for the domination of space through further militarisation and the intent to fight wars in, from and through space. The increase in launches also inevitably leads to an increase in accidents, space debris and pollution by propellants. So questions as to why we use space, and how we do so, are certainly valid.

The various authors tackle the definition of the ethical use of space in different ways. Most are clear that to increase the use of space for military purposes is not ethical, but that there are benefits to humankind of furthering some space based projects (e.g. environmental and hazard monitoring, weather prediction, global communications, etc.). However, the increasing use by the military of civilian systems for surveillance and photo reconnaissance purposes and the development of dual use (i.e. joint military and civilian) projects makes it more and more difficult to determine what the ultimate role of some missions may be. A major question then becomes: what criteria can we use to assess whether a particular space shot is justified?

The section on "Criteria for Research and Space Use" several sets of criteria for the assessment of space projects are discussed. In "Peaceful and Sustainable Use of Space – Principles and Criteria for Evaluation", Jürgen Scheffran suggests eight conditions for assessing future space projects that should:

- Exclude the possibility of severe catastrophe
- Avoid military use, violent conflict, and proliferation
- Minimise adverse effects on health and environment

- Assure scientific-technical quality, functionality, reliability
- Solve problems and satisfy needs in a sustainable and timely manner
- Seek alternatives with best cost-benefit effectiveness
- Guarantee social compatibility and strengthen cooperation
- Justify projects in a public debate involving those concerned.

Hartmut Sax discusses the "Justifiability of Space Activities" and outlines some of the possible health and environmental risks, while Ruben Apressyan gives an interesting Russian perspective.

In the section on the "Use of Nuclear Power in Space", Roland Wolff gives details of the medical aspects of plutonium releases in the atmosphere. In a chapter on power supply systems for deep space missions, Kai Petzke concludes that plutonium generators harbour unacceptable risks, reactors are safer but less trustworthy and solar panels are safe but cannot be used at large distances from the Sun. The failure rate of launch vehicles does mean that there is a relatively high risk of contamination from any nuclear materials on board. The protests around the launch of the Cassini probe in 1997 and the 1999 fly-by are measures of the public concern about this problem. Göstar Klingelhöfer relates how the decision to use plutonium generators for the "Mars Surveyor" program was revised and solar technology was used instead and Uwe Bonnes discusses problems and the technical developments associated with reducing the energy requirements of payloads on space missions.

A section on "Missile Defence" includes chapters by Götz Neuneck and Michael Schaaf and Bernd Kubbig which are now a bit out of date but give a useful description of the missile defence architecture and the debate around the Anti-Ballistic Missile Treaty which was still in force at the time of writing (pre George W. Bush).

The section on "Military Use of Space" includes a chapter by Wulk von Kries on the dual use of remote sensing. This is an increasingly

important area of concern. The US military use of commercial space systems in the war on Iraq and elsewhere has demonstrated how dual use systems can play crucial roles in battle planning and management (and perhaps, in the future, delivery?). Dieter Engels presents a very useful European perspective on this matter. Particularly important are the moves to change the policy of the European Space Agency (ESA) to dual use, changing its role from purely civilian to dominantly military. In "The Weaponization and Nuclearization of Space" Karl Grossman describes in chilling detail the aspirations of the US military. Referring to documents such as "Vision 2020" and "The Long Range Plan" of the US Space Command he illustrates the source and objectives of the doctrine of 'full spectrum dominance'.

In a section on "Science and Manned Space Missions" Wolfgang Engelhardt (in "Small Space Philosophy for Big Knowledge Gains") pleads for an increase in space missions to take humans far beyond the Earth's orbit. He argues that new technologies and exploration creates floods of additional knowledge, although he believes that the International Space Station (ISS) will bring only minor advances, which are hardly worth the effort. The ISS is also used as an example by Johannes Weyer writing on "Manned Space Missions - Useless or Key to the Future?" He describes the technical and financial risks and the pros and cons of the project. He quotes Reimar Lüst, former director general of the ESA, who once defended manned projects but has criticised the ISS, claiming that it 'had mainly been done for political reasons' and 'would hardly break new ground in terms of technology'. Weyer comes to the conclusion that "manned spaceflight is mainly undertaken because

- i. space industry knows very well how to sell their projects as a contribution to the advancement of technology and economics and
- ii. politicians like to bask in the glamour of successful missions."

He too believes that the research that can be carried out on the ISS cannot justify the tremendous costs of the project.

The "Russian Perspectives of Space Projects" is given in this section by Igor Gabelko. He outlines past and current (at time of writing) areas of cooperation between Russia and Europe. He says he is stating a commonly held Russian belief that nuclear power sources do need to be developed for future missions but that nuclear weapons in space should not be allowed.

The section on "Conflict and International Space Law" includes a short paper by R. Balasubramaniam from the Indian Embassy in Germany on "Who Controls Space?" He concludes that the answer to this question is "space coordinators" and that international control has not been developed beyond that described by early UN treaties because of conflicting interests. In a chapter entitled "Peaceful Use of Space and International Space Law", Hans-Joachim Heintze points out that a major problem with the Outer Space Treaty is that it does not define the term "peaceful". International law defines "peaceful use" as "non-aggressive rather than non-military", thereby excluding the placement of nuclear weapons and other weapons of mass destruction in Earth orbit but not explicitly prohibiting the military use of space. He concludes that it is not possible to obtain East-West agreement on the military use of space. The US monopoly of military space use poses serious problems and leads to the situation where, in times of conflict the US can gather together a great deal of useful information through its space systems but will not necessarily share it with the UN Security Council.

Another short paper by Kai-Uwe Schrogl on "Space Law and the Principles of Non-Appropriation" looks at the status and further development of space law. He points out that although the Outer Space Treaty (the "Magna Charta" of Space) explicitly states that:

"Outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation or by any other means"

US companies are already selling real estate on the moon and declaring interests in owning and mining asteroids. Such actions will inevitably lead to the need to defend ownership of resources and Schrogl concludes that; "such a scenario has to be avoided. And this can only be achieved through the preservation of the principle of non-appropriation."

The final section is on "Space Research and Space Policy" has a chapter by Andreas Schlossarek on "The Future of Space Research and Policy". He presents the results of the 1993 Working Group "Employee Councils and Personnel Committees from Research Centers" under the heading of "Social Responsibility in Research". Schlossarek, demands that all planned space missions funded by German tax-payers should be publicly discussed and debated. In the final chapter of the book Regina Hagen, follows up the demands made in the previous chapter by putting forward twelve "Demands on Future Space Research and Policy". These include the establishing of transparency and an open dialogue for all future space projects. Hagen believes that citizens have a "right for complete and understandable information" about space missions and space budget plans. This must be the key to reaching a societal consensus about space projects. It does not preclude the conduct of expensive but exciting missions - as long as a consensus can be reached.

So, even though the chapters are 3 years old and things move rapidly in this field, this is still a thought provoking and informative book for reference or to read straight through. Volume 2 in this series looks like it will contain a wealth of related material and I look forward to seeing it.

Dave Webb

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Hosted by Jeremy Corbyn MP, with Keith Bennett, former editor of Asian Times. 7pm to 9pm in Committee Room 9, House of Commons, SW1. Organised by Labour CND.

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University of Salford

Email: festival@the-ba.net

13 September 2003

SGR Conference and AGM

see front page for details

25 October 2003

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

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