

# Scientists for Global Responsibility

Newsletter No. 21

Autumn 2000

## Special Issue on Information Technology

### Strategic routes to greater influence

#### Vanessa Spedding

It is a neat coincidence that this special issue on the impacts of the information technology revolution comes at a time when SGR is preparing for its own revolution of sorts, and one in which IT will no doubt play an increasingly important role. As you will know, SGR began the year by establishing a plan for consolidating its future direction and aims, and means of implementing these. The first part of that plan took the form of a written survey to establish members' interests and perceptions of the role of the organisation. Tess Woodcraft, our external advisor, undertook the survey and presented the results.

Tess also facilitated an "Awayday" in March which further explored some of the key issues. Reports on these two activities have been distributed.

This first Awayday helped to identify the priority audience for SGR (scientists and the scientific community) alongside secondary audiences (decision makers and the public) and to make progress toward a mission statement and a recognisable "personality" for SGR. There was also discussion about the potential benefits and pitfalls of a name change, still underway.

A second Awayday in May took these issues further still. We now have three statements that help define the essence and purpose of SGR. For those without on-line

access the working drafts of these are:

*Value statement:* SGR is an organisation of scientists and engineers committed to the ethical and accountable practice and use of science and technology. We believe science and technology should be used responsibly, in a way that is just and fair, that contributes to peace and human rights and that enhances rather than threatens the environment.

*Vision statement:* SGR has a vision of science as critical, challenging, questioning and truthful; a science independent of vested interests that is appropriate for a socially responsible democratic society.

*Mission statement:* SGR:

- provides an open, democratic interdisciplinary forum for science and scientists
- promotes the ethical and accountable practice and use of science and technology
- offers analysis of current issues across a broad range of scientific and technological fields, applications and subjects
- promotes the precautionary principle in science

And there are ambitious plans afoot, as Tess Woodcraft reported in her notes: "SGR is the only organisation of and for scientists committed to ethical and responsible science. There is undoubtedly an increasing interest, both inside and outside the scientific community, in the need

for the rigorous, ethical and accountable practice and use of science and technology. It is clear that members want to rise to this challenge. There is a definite commitment to take the organisation to another level of activity where SGR becomes bigger and employs paid staff. SGR will need a strategic plan, a business plan and much more money."

The proposed strategy for the development of SGR over the next five years is outlined over the page. Philip Webber and Stuart Parkinson are drawing up a schedule. Contact Phil (PhilW@sgr.org.uk) or Stuart (StuartP@sgr.org.uk) with offers of help and comments.

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# News from SGR

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## Raising the game: a strategy for modernising SGR

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Compiled and edited from various notes produced by Tess Woodcraft with additions from Philip Webber, Stuart Parkinson, Tim Foxon and Alan Cottey

If SGR is to move forward as an influential and successful organisation with the resources to implement its mission, a fresh plan is needed: this conclusion emerged quite clearly from the member survey, the two awayday strategy sessions and subsequent meetings.

SGR has some key strengths. It has a loyal membership and has developed a number of sound projects. It is good at appeals, producing the newsletter, maintaining the Web site and devising interesting project themes (eg Climate Train, Ethical Careers). However, SGR needs to raise its game. At present it is a small group of well-meaning people concerned about science who have been together for a long time.

SGR should be more prominently reflecting the growing interest and concern about scientific developments, and this observation has called for the definition of clear mission, vision and value statements. Now SGR must determine how to build the organisational capacity required to fulfil its mission, in other words, the resources required to:

- provide an open, democratic and interdisciplinary forum for science and scientists
- promote the ethical and accountable practice and use of science and technology
- offer analysis of current issues across a broad range of scientific and technological fields, applications and subjects
- promote the precautionary principle in science

Four main objectives have been identified as being necessary to achieve these aims. SGR should therefore now be aiming to:

- Increase its membership
- Develop its information/publishing/education/debate activities
- Develop a research capacity (to track what scientific research is being undertaken and how it is being funded)
- Build on existing projects (eg ethical careers work)

It was agreed to pull together a plan to this end. Three groups have been established to explore and firm up ideas.

### Groups

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Group 1 will devise a set of fundable projects, based on what SGR already does, with the aim of appointing an education officer, a research officer, an information officer and a careers/student advisor. For example, work on the careers guide could be packaged into a number of different “products” – say a 16-page pamphlet, a 60-page book, a mentor service, seminars etc – and the revenue attracted by these could be used to fund a careers/student advisor (who would also help boost recruitment).

Group 2 will focus on membership and marketing. For this, Tess Woodcraft has proposed how projects, seminars, the newsletter, the SGR forum, associate membership, posters, on-line debate, etc can increase membership. This group will look specifically at positioning/branding, targets for increasing membership, target groups, the subscription structure and the membership package. It will also investigate the use of appropriate products to attract members (eg SGR Forum, the newsletter, posters linked to on-line debate). NB. Market research is underway to establish whether a change of name would be of benefit to SGR.

Group 3 will look into our publications strategy with a view to turning the current output into a coherent publishing operation (to include the careers guide, GM publications, the PCV newsletter etc). It will investigate methods for eliciting more ideas and commissioning more written work, including encouraging members to provide material. Some new ideas suggested include: “State of the Debate”: a series of summaries of key debates in science and Devil’s Dictionary (The little book of global devastation). It will also be necessary to produce a clear publishing strategy that takes a systematic approach to imprint, design, style, series, etc. Potential sources of funding include: MRT appeal, sponsorship, grants.

### Membership and marketing

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Tess Woodcraft has already put forward her thoughts on membership and marketing. SGR, she says, needs to see itself as a unique organisation – with the potential to become a major force within the scientific community. In order to realise this potential, it will need to:

- Increase membership to 5000
- Re-think its positioning and branding, including developing and implementing a new visual identity
- Overhaul existing products and develop new ones
- Develop a recognised office base
- Raise the money to support the expansion programme

Increasing the membership means identifying a clear target audience, principally university science students, scientists (academic and industrial), engineers (including

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computer engineers) and interested individuals. SGR, suggests Tess, needs to focus on replenishing membership by drawing members from younger age groups – after all, SGR stands for the things with a powerful appeal to the idealism of young people – science that is critical, challenging, questioning and truthful, independent of vested interests and appropriate for a socially responsible, democratic society.

Maintaining a close relationship with existing members is also crucial to the success of SGR. Current membership benefits – which include being part of a network of scientists for scientists; belonging to an organisation

committed to scientific objectivity and rigour; having access to an alternative view, and a challenge, to government scientific advisors; discounts on SGR's literature and other services – need to be stated clearly in the literature and possibly augmented with others.

It is important that SGR's visual identity is developed to reflect the organisation's personality (bold, independent-minded, rigorous) and it is recommended that SGR works closely with professional designers to develop a new logo and corporate identity which can then be applied to all products (including leaflets, brochures, reports, annual report, newsletter). The Web site also needs to be developed further.

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### Funding base

Once the programme of work and new products have been decided, it is suggested that a fundraising strategy be drawn up that should seek to establish a diverse funding base for SGR.

**For further information about any of the above or to offer suggestions or contributions, please contact Philip Webber, Stuart Parkinson, Tim Foxon or Alan Cottey at the e-mail addresses on page 19.**

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## “Careers which don't cost the Earth” – project update

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### Stuart Parkinson, CWDCE Steering Committee

Work is continuing on the Ethical Careers Guide. At present we have drafts of twelve of the proposed fifteen chapters (including four chapters edited from reprints), with the others due for completion shortly. The chapters are:

#### *New Articles*

Barry Rubin & Stuart Parkinson: Ethical Dilemmas in Science and Technology:

Practical Experience

Mae Wan Ho: Ethics and Genetics

David Webb: The Militarisation and Nuclearisation of Space

Gideon Burrows: Conventional Weapons and the Arms Trade

Alan Mayne: Politics and Ethical Decisions in Science

Stuart Parkinson: Climate Change and Career Choice

Tim Foxon: Environmental Impact Research

Gill Langley: Ethics and Animal Experiments

Philip Webber: Assessing the Sustainability of your Career

Alan Cottey: Lifestyles and Careers which Don't Cost the Earth

Barry Rubin: Introduction

#### *Edited Reprints*

Joseph Rotblat: The Social Conscience of Scientists

Jeremy Leggett: Ethics and the Oil Industry

Russell Mokhiber and Robert Weissman: The Nature of the Machine

Tim Berners-Lee: The World Wide Web, Computer Science and Open Information

We would like to thank all the authors for their time and effort in carrying out this work for us.

Dr Barry Rubin has now finished his six month contract on this project. We would also like to thank him for his valuable efforts on this project. The National Co-ordinating

Committee is continuing the work to completion. To date, tasks (1) and (3) have been completed, with the other tasks in progress.

It has become clear during the course of the work that two versions of the guide will be produced: a short version (around 20 pages) for free distribution to Careers Offices and students; and a more detailed version (around 150 pages) for sale. Further funding is being sort for the Guide's publication.

If you would like to complete the questionnaire, either go to the web-page:

<http://secure.virtuality.net/sgr/SecQuest.htm>

(accessible from the SGR home-page <http://www.sgr.org.uk/>)

or contact the SGR office for a hard copy.

For further details of the project, see the SGR web-site or send an email to:

<[ethicsproject@sgr.org.uk](mailto:ethicsproject@sgr.org.uk)>

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## A few words from the Chair..

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**Phil Webber**

### Committee meeting update

The last NCC meeting was held at IC on September 9th. The main actions which will follow are:

- A gradual update of the SGR Web site
- A release of a new Web-based discussion forum
- An updated SGR leaflet and a “how you can help SGR” leaflet.

One main conclusion from the survey of possible new names is

that SGR is recognisable and quite a popular choice. People also like the idea of SGR as a Forum of some kind.

The minutes will be posted at: <http://mattasp.ewebcity.com/db/sgrforum/>.

### Insert info

You will notice that this issue includes a promotional leaflet from Earthscan Publications. We have agreed to include it because we believe their publications to be of interest to members. However we

would like to remind you that we never pass on our membership list to any other organisation (or individual). We only include relevant material from other organisations with the newsletter if it appears of genuine interest.

This is either in exchange for a small fee to help cover costs or on an exchange basis to help spread awareness of SGR.

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## Update on SSN: new focus for ethics studies

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**Alan Cottley**

The Centre for the Study of Global Ethics at the University of Birmingham was launched in May this year. Professor Hans Kueng, president of the Global Ethic Foundation, gave a public lecture to mark the occasion entitled “A Global Ethic for the New Millennium”.

A professor and support staff will be appointed to the centre. The university states: “Global Ethics is concerned with the need to take seriously in international policy-making the wide range of value systems operating in the

contemporary world and to search for and construct the common ground between them.”

### SSN involvement

The establishment of this centre was supported by members of the Security Studies Network (SSN), a group of about 50 people who maintain between them associations with a number of organisations.

For SSN, effective peace-building embraces the economic, social, cultural, humanitarian and environ-

mental aspects of life, creating a multilevel security support bank.

SSN took the opportunity of holding a meeting after the lecture in Birmingham. About 14 members were present and offered short outlines of current work and near-future plans. As SGR’s contact person with SSN, I am glad to report that I found this exchange with committed and creative people involved in a wide range of progressive projects most heartening.

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## Psychologists act out confrontation avoidance

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A broad range of people – with interests ranging from military peacekeeping to post-conflict forgiveness – gave talks at the Third International Symposium on Drama Theory and Confrontation Analysis. The event, held at Birkbeck College in July this year, was sponsored by the Conflict Research Society and organized by Jim Bryant together with Nigel Howard and Peter

Bennett, with additional generous support from University College London.

Drama theory provides a method of modelling the pressures that drive parties who interact - whether in a conflict or a collaboration – to shift position and achieve (or not) a resolution of their situation. It takes the dilemmas – about how to be credible or trustworthy, for example

– that confront a rational “game player” as its starting point, and goes behind these to assess the emotions that accompany accommodations with others.

As a method of conflict analysis, it offers an effective method of tabulating the potential options and outcomes for different parties engaged in a confrontation or a collaboration. It can also be used as

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the basis for role play exploration of conflicts, or as an element in a mediation process. There is considerable overlap with the approach taken in more recent forms of game theoretic analysis (e.g. metagames) in the focus upon "characters" (players), "actions" (options) and "frames" (games).

Additional details about the uses of drama theory and the symposium talks can be obtained from Jim Bryant, Sheffield Business School, Sheffield S1 1WB, UK.

Web: <http://www.drama.u-net.com/>  
E-mail: [J.W.Bryant@shu.ac.uk](mailto:J.W.Bryant@shu.ac.uk)

Information about the Conflict Research Society is available from the Secretary, David Maxwell, 14 Shakespeare Rd., Bedford MK40 2EA, England.

By *Joanna Britton, Herb Blumberg, Jim Bryant*

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## Elsewhere in the news.....

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### **Ethics a factor in research collaboration paper**

Declan Butler reports, in *Nature* (27 July) that Philippe Lazar, president of the Institut de Recherche pour le Developpement, has drawn up a draft text of a declaration of broad principles which should guide research collaborations between the industrialised North and the developing South. The article describes briefly the varied reactions of a number of persons involved in the areas "science and ethics" and "N-S research collaboration".

<http://www.ird.fr/fr/inst/ird/debat/>

from Alan Cottey, on *sgrforum*

### **Politically responsible is different from ethical**

Ute Deichmann presents an essay in *Nature* (15 June 2000) on the dangers of "politically responsible" science in an attempt to address the difficulties faced by individual scientists in dealing with the "dangerous dance" of science and politics. He argues that although disillusionment concerning the contributions of eminent scientists to the Nazi regime led many to reject the notion of pure and universal science as a myth, any call for politically responsible science does not guarantee an ethical stance. Science that may be deemed politically responsible in one environment or era may not be so in another. The author suggests that there is a scientific level outside politics, ethics and applications, and that it is not the quest for knowledge that was responsible for the Nazi atrocities

but the fact that scientists did not pay due regard to normal ethical principles. He concludes that "the call for politically responsible science, frequently heard today, cannot solve the problem of how scientists can prevent science from serving immoral, inhuman ends".

*Based on a summary by Science-Week (scienceweek.com), 21 July 2000.*

### **Safer way to link photovoltaic systems to electric grid**

Sandia National Laboratories in the USA claims to have developed a new, safe and effective way to connect photovoltaic (PV) solar systems to utility-company power grids.

Called the "non-islanding inverter", it method relies on a piece of computer code built into the inverter portion of the photovoltaic system. The code implements a control method that automatically diverts or turns off electricity flow from grid-connected PV systems when an electric distribution line shuts down.

Prior to the development of this method, photovoltaic systems could not determine that a line had been de-energized under conditions of power shutdown: they could therefore continue sending electricity through a line under circumstances where automatic shut down or electricity diversion is required. This could result in possible safety hazards and equipment damage.

Sandia says the goal is for inverter manufacturers to adopt the technology as a way to make solar

power a more viable option for electricity production. The concept also can be used with other types of alternative energy such as fuel cells and microturbines and has been added to IEEE standards. <http://www.sandia.gov/media/NewsRel/NR2000/pvmeth.htm>

### **Food agency to investigate pesticide levels**

Britain's Food Standards Agency has vowed to investigate risks posed to consumers by pesticides in fruit and vegetables.

A recent report by the Pesticide Residues Committee showed pesticide residues in food to be mostly within safety limits. However, environmental campaigners have condemned the report for saying products were safe, and the chairman of the Food Standards Agency has admitted it is unacceptable that 1.6% of 2,500 samples of food had pesticide residues over the legal limit.

### **Can Europe deliver on promises?**

The European Union has claimed that it is on target to meet its international commitment to reduce emissions of carbon dioxide and other gases thought to cause climate change.

According to an EU official, statistics soon to be published will show emissions of greenhouse gases to have stabilised at 1990 levels. Under the Kyoto Protocol, the EU committed to reducing its greenhouse gases by eight percent of 1990 levels by 2008-2012.

*Summaries by Vanessa Spedding*

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## Media mergers give cause for concern

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### Felix Grant, James Putnam, William McRostie point out the possible effects on freedom of information that could result from a service provider monopoly

The third wave information revolution is now beginning to break around our daily world. As it does so, it drives formerly well-understood organisational vessels into uncharted waters. New and untried business models spontaneously generate, race ahead of lumbering regulatory mechanisms, then either sink, shape-shift, or merge with others. The ultimate results of these changes are impossible to predict; the best we can manage is a myopic peering at likely immediate impacts on the microscale. A year is a long time in this environment; a decade hence is an unimaginably mythic time of heroes and villains, utopias and catastrophes. The industrial revolution was in slow motion, by comparison.

Like all revolutions, this one demands decisions for which we must be responsible. The tree of liberty, as Jefferson reminded us, is a fragile plant. If his talk of refreshing its roots with blood is excessively dramatic for the present case, we nevertheless live in days when we must practise eternal vigilance as never before: censorship is death to social responsibility, and requires only that individual women and men do nothing to oppose it. Science is, in essence, information; biotech, the current crucible of scientific morality, is information; and information is globalisation. Scientists are at the wavefront of the revolution, and if they would be globally responsible they must look to the integrity of those arteries along which the information flows.

What, for example, are the implications of such media business mergers as that between Internet online provider AoL (America On Line) and publishers Times-Warner, for uncensored academic intercourse? Peering through the maelstrom, in the uncertain light of past experience, there appear to be three main avenues of potential risk:

content, means of exchange, and indexing. The first and second are simply updated faces on old problems, relatively open to scrutiny; the third is in some ways new and insidious.

Restriction of content and the means of transmission have a long history. A relatively recent example of restriction by merger acquisition lies, appropriately enough, in the family tree of the AoL-Time-Warner entity itself. Chomsky and Herman describe an occasion when a small publisher was set to issue a book which questioned actions and values of the US military-industrial complex; Warner acquired the smaller concern in a take-over and axed the offending title before publication. Whether such heavy-handed suppression was worth the expenditure is questionable. Chomsky and Herman's account through another publishing group with a different agenda probably reached a far greater readership than the suppressed book would have managed - and the suppression itself gave a gloss of enhanced credibility.

Technology and economics have their own dynamic that tends to undermine the efficacy of suppression. To lock up or to burn books was an effective measure when books were rare and expensive, readers far and few between. Such measures became progressively more difficult to apply (and required increasing levels of collateral repression) with the introduction of moveable type, powered mass printing, widespread literacy, the typewriter, the duplicator, the photocopier. Samizdat and the fall of the USSR, de Gaulle's use of radio against the colons, the role of the audio cassette in overthrowing Iran's Shah ... all of these illustrate the declining rate of return on such a crude approach to censorship. The Internet, designed to be a self-healing structure capable of surviving and circumventing massive infra-

structure losses in nuclear war, implemented by a myriad competing nodes, is less realistically tameable in the long run than any preceding medium. At least two powerful dictatorial regimes have spectacularly failed to control net-borne information leakage past their borders; one (the USSR) has paid the price of its own existence, the other (China) is evolving to survive unavoidable transparency. If these two could not pull the trick in a geographically self-contained context, it seems unlikely that more diffuse and decentralised commercial organisations will succeed.

There is, of course, that other threat to content which is known as "dumbing down", but this is a function of large scale media, not large scale monopolistic ownership. A single provider is no more likely to cut costs at the expense of intellectual variety than a competing market; and smaller speciality providers have shown a tenacious tendency to emerge as information systems go global. This is, in any case, not an area where science can exert much control.

Indexing, however, is a different matter. It, too, is progressively more important in the explosive informational environment of the Internet than in preceding media. How would you ever find anything at all, in your computerised world of information, without search and indexing tools? Polish polymath Stanislaw Lem, on numerous occasions in text and film, expressed the danger early on:

"...what can be done when an important fact is lost in a flood of impostors, and the voice of truth becomes drowned out in an ungodly din? When that voice, though freely resounding, cannot be heard, because the technologies of information have led to a situation in which one can receive best the message of him who shouts the loudest, even when the most falsely?"

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What, indeed? Nobody can honestly offer long-term answers in such a fast-changing environment, least of all the authors who differ widely in their reading of the runes. On the immediate dangers and the apparent solutions, if not the balance between them, they nevertheless find themselves in accord: the freedom or censorship of the Internet depends upon the real, not apparent, plurality of search engines and other indexing tools in use.

There are about thirty thousand Web search engines or other indexing sources easily found, and many times that number with some effort, but most users rely upon only one. For an overwhelming majority of users, this one source will be drawn from a very small pool of half a dozen engines or less. For most, that one will be the option presented to them by their point of entry to the Web, and therein lies the rub: a dominant portal will, by definition, dominate the choice of paths which users habitually take across the immeasurably huge sea of data. If a page, term or topic is not indexed (for whatever reason) by the chosen system, it will never be found.

Multiple search and metasearch tools dilute this dominance, but only to a degree. The excellent and widely used *Copernic*, for instance, accesses 14 sources - but most of these are from the same subset of "big name" engines that most individuals will use in any case. Implicit censorship of some of those engines will be side-stepped, but a consensus amongst them all (or even most) could still significantly depress access. Other metasearchers are potentially more insidious still; they offer the apparent impartiality of multiple access, yet choose the points of that access and are under the direct control of the portal or provider which supports them. Such programmes rely upon regular updates; there is no way in which a user could be easily aware of deliberate or inadvertent censorship introduced via those updates, should such a thing ever occur.

None of the authors believes that a conspiracy towards such indexing

deformity exists; but the theoretical potential certainly does. Designed search tests reveal a definite asymmetry in hits related to topic, which varies from engine to engine. A conspiracy is not impossible, and unintentional bias is inevitable. While plurality is maintained, the bias will vary and normal discourse will disseminate material despite these biases; a sufficient market dominance by one provider, however, will inevitably skew sampling pathways. A future near monopoly might, hypothetically, go further, making temptation to conscious censorship irresistible.

This, then, is the red light above mergers such as AoL-Time-Warner. AoL provides the point of access for more users than any other provider. If academic users experience an urge to feel superior about this, they should restrain it; as the AoL use base has expanded, it has brought within it many of their fellows. Dominating the provider market also means dominating the choices of index resources. With the Time-Warner-AoL merger, this access dominance is allied to a powerful producer of content. It would be astonishing if the result were not, through convenience if nothing else, a further skewing of the indexed base in the long run.

None of this need be terminal; nor should it be dismissed. The outcome lies in the hands of users, and at the mercy of wider socio-economic inertial forces. The world is changing in many ways, and the meaning of words change with it. Do words "competition" or "monopoly" or "antitrust" mean the same thing now, in an increasingly globalised world, as they did in the days of national supremacy?

A recent Washington Post column by Robert J. Samuelson argues that in 1890, when US antitrust laws were written, competition meant price competition but:

"...today's most significant competition doesn't involve identical products sparring over price. It involves rival technologies struggling for superiority.... For most technologies, standards are vital. Without them, mass markets are

impossible. Sometimes standards arise by voluntary agree-ments... sometimes from the triumph of one or a few firms. The check on the dominance ... is the threat of a new technology."

Alongside this, Thomas L. Friedman is one of many who argue that size in itself is less important to the balance of freedom and efficiency than relative or proportional size within the arena. How big or absolute will a monopoly need to be, in order to survive, maintain competition, or pose a threat to competition, in the emerging global info-economy? We don't know; what is certain is that the potential risks are greater if we, as consumers, are lazy or accepting than if we press informed demands upon our suppliers.

Scientists are well placed to act as one body of self-appointed guardians in this way. They rely upon free flow of information in order to function; but their efficient functioning is also vital to the corporations that may seek to dominate. Use a multiplicity of search and index facilities, not just the one that is to hand. Make regular searches for contentious viewpoints in your area of expertise, especially if you disagree with them ... if you are a gene scientist, for instance, how easy is it to find the views of those who call you the antichrist? If you can't find them, you may feel relieved but you should really be worried. Remember the words of Pastor Martin Niemöller:

"I didn't speak up ... Then they came for me - and there was nobody left to speak up for me."

### **The authors**

*Felix Grant is an academic and research consultant based in the United Kingdom.*

*James M Putnam is an information systems analyst with the postal service in North Carolina, USA.*

*William McRostie is a lawyer with a particular interest in Internet issues; he lives in Minnesota, USA.*

## Alan Cottey outlines the Open Science proposal and how IT developments could help with its success

The Open Science Proposal recommends that the scientific community would benefit from a widely recognised protocol of openness, applied to individual scientific projects. Projects performed according to the standard of “radical openness” could claim a ‘gold standard’ of openness, but it is likely this this would only ever amount to a small fraction of all scientific projects. Such projects would permit detailed scrutiny and criticism, and thereby furnish an efficient route to socially established, reliable knowledge. Open Science has certain particular implications for information technology, which are covered in the latter part of this article.

### Denouncing secrecy

In the Open Science Proposal, I suggest a specific modernisation of current ideas about openness in science. The starting point is the recognition that there are places in society for such contrary qualities as reserve, discretion, tact, and secrecy (Bok 1982). The next point to note is that the word science is nowadays freely used to cover a wide range of activities, and these activities are not merely *linked* with society, they are *embedded* in society. Given this situation, we need to step back from what Sissela Bok called the ritualistic denunciation of secrecy in science.

I use the following terms to describe four levels of openness in science. The first three already exist. The fourth may come to be, if we wish it.

- Secret Science: even the existence of the project is concealed
- Restricted Science: publication of the results is subject to strict limitations in respect of timing and level of detail. Most commercial and applied government (including military) science is in this category
- Circumspect Science: scientists publish when the project is

complete, but until then are quite ‘closed’. Academic science, as practised to date, and when not Restricted, is in this category

- Open Science: is the subject of this article. It has a precise definition, which can only apply to those projects that are performed according to the Open Science Protocol.

The Open Science Protocol is still at the embryonic stage of development. Its core is that the following stages of an Open Science project are all open – in other words, the information is made freely available – as they occur.

- passage through institutions’ ethics and safety committees
- application for funding
- review by funding body
- funding body’s terms for support
- institution’s terms
- log of the course of the project
- reports
- manuscripts submitted for formal publication
- referees’ comments, revisions, published papers
- archiving of concise but detailed records of all the above stages.

Many aspects of this proposal require further elaboration, and more information on some of the points not covered in this short article may be found on the SGR Web site and in Cottey 1998. The questions that scientists raise most immediately centre on the belief that openness during a project is utopian, and therefore impossible. For example: “Why go to the extra trouble of doing a project in a completely open way when there is associated risk?” The answer to that is that there would be an incentive to do so, namely enhanced credibility. Work that can withstand the scrutiny of all who wish to scrutinise is likely to command

recognition. Another question: “What of the risk of a smart competitor taking your promising idea and pipping you to the post of definitive proof?” The answer to that is that there is this risk, but most of us have an inflated conception of how interesting our latest bright ideas are to others. A much more common problem is to get others to take them seriously! And by posting one’s progress, essentially in real time, one is putting down markers of possible priority much more efficiently than happens with the current (publish-when-everything-is-complete) practice.

“Would not such a warts-and-all exposure be horribly embarrassing?” This attitude is symptomatic of a secretive milieu. In the current mode, disclosure has a disproportionate impact as a result of a cycle in which secrecy is broken in a moment of disclosure that has sensation associated with it, which breeds a fear of openness and therefore further secrecy.

By contrast, in the Open Science mode, objections of a named referee, or disagreements on research in progress, would be no great deal – merely single items in a large amount of available information.

### IT implications

Doing a project the Open Science way will obviously involve a large amount of recording, storing and accessing of information. Is it practicable? Before the IT era, the answer would be ‘hardly’.

IT has transformed the situation. I see the Open Science way as taking its place alongside the three traditional ways of doing science (Secret, Restricted and Circumspect). The Open way will probably never become the principal way. There is, indeed, no need for that, for the small fraction of all scientific projects that would be undertaken according to the standards of radical openness would have an influence beyond their number. Consider, for example,

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those areas that are bedevilled by mistrust between experts (whose expertise may be debased by peer-group special interest) and outsiders (whose less-informed judgements may be faulty). One such area is the biological effects of ionising radiations. An Open Science approach to projects in this area could be particularly helpful, although overcoming barriers in order to set up and complete an open project would, admittedly, be difficult. The first Open Science projects - and none have been attempted to date - should be uncontroversial, simple and short.

So - the number of Open Science projects need not be very large. Nor need the volume of data collected and preserved be unmanageable. It will usually be possible to perform front-end reduction and parameterisation of raw data in ways that do not compromise the principle of openness. Naturally the procedures and algorithms used will be published. Analysis further down the line, which is subject to more assumptions, will be recorded and stored in more detail.

Today, it is relatively easy to record, store and access large volumes of data. The principal data problem for the Open Science Proposal is, I suggest, the variety of the data. Openness, for this proposal, goes beyond simple technical data. Diverse information about conditions such as the funding application, the conditions of employment, breakdowns, etc should all be recorded. Some exceptions are appropriate, of course, such as confidential parts of staff records.

Two IT developments currently underway may ameliorate the problem of recording, storing and accessing heterogeneous data. One is the development of world standards for dealing, in a unified manner, with data in varied formats - documents, databases, graphics, sound recordings, etc. The World Wide Web Consortium's RDF (Resource Description Framework) is an example (Berners-Lee 1999).

Another relevant IT development (Johnston 1999) is LIMS (Laboratory Information Manage-

ment Systems). LIMS are normally designed for the integrated management of a commercial company's range of scientific projects. A similar system adapted to Open Science should provide two services - a tool that makes it easy for project staff to conform to the Open Science Protocol and a set of IT standards that make it sufficiently easy for all to access and comment on an Open Science project.

The development and take-up of Open Science will be slow in comparison with the continuing rapid development of the Web. By the time the early versions of the Open Science way are tested, the Web should be a very convenient vehicle for recording, storing and accessing Open Science project data. Problems arising from the variety of objects, authorised editing, authenticity and archiving are far from trivial, but they should be soluble.

The key is to refrain from incorporating software that is more open-ended than necessary. Open Science practitioners should be offered as much flexibility in their use of software as is needed, but not more. The Open Science Protocol should include a requirement that data be placed on the Web in formats that are recognised and working global standards at that time. That early versions of Open Science could not, for example, support projects generating very large amounts of data would not be a significant defect.

IT has a bearing on the choice of Open Science infrastructure. A single, centralised architecture would require an Open Science Institute to keep a fairly tight rein on Open Science practice. The more attractive alternative would be to follow the philosophy of the World Wide Web and the World Wide Web Consortium. Successive versions of basic Open Science standards, principally the Open Science Protocol, would be published as a consensus by those interested. Then any investigators could unilaterally declare themselves as doing a project the Open Science way. There would be no formal, centralised monitoring but all outsiders could judge for

themselves the quality of adherence to the protocol, and the quality of the work itself, including the quality of any open refereeing that had taken place. The build-up (or decay!) of acceptance of a project's claims would occur partly by open comment on the Web. Open Science would become a visible college.

A few words are needed about archiving. The Open Science Protocol should include a requirement for arrangements to archive for a fixed period of time. Thirty years should be sufficient to permit most work to be absorbed into the canon of reliable scientific knowledge, or rejected, or quietly forgotten. In principle, an archive review would also take place after 30 years, so that projects of continuing interest could be preserved longer.

Technology drift is sometimes mentioned as a problem associated with archiving: if data are recorded using hardware or software that becomes obsolete, they may become effectively unreadable or lost. I suggest that was mainly a problem of the early years of IT. Although IT continues to develop rapidly, there is today more awareness of archivists' needs. Now, if the advice of professional archivists is followed, Open Science records should be readily accessed for 30 years, with the option, if required, for importing the records into a new storage system at the end of that period.

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## Emerging information systems present new views

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### Alan Mayne outlines his vision of the future evolution of information technology and the issues arising

Bill Gates had a vision of “a computer on every desk and in every home”. Rapid developments in Internet technology mean it is easy to broaden this, to the wider vision of “a compact, portable, multipurpose, multimedia, information technology system on every desk, in every home, in every pocket, and affordable by every person”.

Achieving this goal will require extensive, world-wide research and development by leading computer and IT companies and universities and could take up to about a decade to fulfill in the developed world. It will involve further convergence between computing, telecommunications and broadcasting, and also between information technology and information content. The benefits to less developed countries are clear as long as such systems are affordable by local communities. In our society we would see integrated home, office, and mobile systems that would combine the functionalities of computing and communications at diminishing costs. Improvements to the usability and user-friendliness of PC, IT, Internet, and multimedia systems will be required, but if this occurs, I predict that the cost of useful, timely information will drop as sharply as the cost of computing already has, and that the convenience of access to information, communication, and IT facilities will rise as rapidly as computing power already has.

#### The user's view

I envisage that the development of a general-purpose communication interface, communication infrastructure, and information-communication systems will be central to this shift. In my view, user-friendliness is the problem that most urgently needs addressing. Extensive studies of how various groups of users perceive and use their interfaces with these systems are required. Systems will need to

cater for individual user needs and learn to adapt to them, allowing, for example, for variations in perceptual modes, for the need to provide individually adapted comfortable interfaces, and for the need for much improved classification systems to enable faster and more effective information retrieval. Time wastage caused by inadequate interfaces also needs to be minimised.

Allowance should also be made for ranges of user preferences, which often reflect differences in their psychology and personality types. It should not be assumed that a highly graphic interface, with a mouse, suits all users best. It should also be possible for a user to adapt the interface to his/her needs. Where possible, upgrading of systems should gently incorporate the new improvements into the old system. Where a leap to a new system is necessary, it should leave room for continued use of the most desirable and desired parts of the old system. And of course, mutual compatibility is needed in all directions.

#### Emphasis on information

New systems are likely to increasingly emphasise information content and useful transactions, adapted to the needs of individuals, groups, and organisations, with hardware becoming more convenient to use. Software would be designed to be almost crash-proof and more tuned to requirements. Specially designed information-content software and systems, for example, would ease the retrieval and application of information in subject areas of interest. Specially compiled databases of information on these subjects would be compiled and regularly updated by subject and interdisciplinary experts.

As integrated computer-information-communication systems become affordable, their use will become more widespread. Ultimately, there could be home,

office, and mobile input/output terminals for nationwide, eventually world-wide, computer utilities at an affordable price. These utilities, I envisage, would be run by public-private partnerships.

#### The private view

A widely accessible set of distributed computing, information and communication services brings some immediate questions to mind. One of these is privacy. Encryption methods, for example, are vital tools for the protection of confidential information across a public network. If the US government were to succeed in imposing its proposed restrictions on encryption, they would threaten individuals' rights to privacy. Such moves might undermine the natural evolution of the information infrastructure of the 21<sup>st</sup> century, and require careful consideration.

The issue of information rights and privileges is an important one, and applies to intellectual property – which requires legal protection – as well. Many perceive intellectual property rights as a hindrance to the free exchange of information, and considerable numbers ignore them, for example by using ‘pirated’ software.

In Mayne (1995, p 61), I stated my preliminary ideas on possible ‘win-win’ approaches to this issue, which would fairly reward creators, publishers, and other legitimate owners of intellectual property while at the same time freeing up access to, and uses of information and databases.

Such a system would combine several possibilities. One is to place general charges on the use of information, computing, and telecommunications systems to enable the funding of fair rewards for the owners of the information, so that specific permissions would not usually be necessary. The reward system could be made more sophisticated: minimum ‘basic rewards’ might apply to intellectual

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property, for example, with 'additional rewards' based on the suitably weighted votes of creative people, qualified reviewers, and users in general.

Another possibility would be to subsidise (by the above) that intellectual property which makes valuable contributions to education, and outstanding works of art and music. More important pieces of intellectual property could be widely distributed on inexpensive media such as DVD-ROMs, CD-ROMs and diskettes, thus reducing the contribution per user towards a fair reward.

Considerable research will be required to develop practicable proposals for such reforms. Progress towards such a reform is likely to be held back much more by intellectual property legalities than by any technical problems.

### **The sinister view**

Distributed computing may have its dark side. McKie (2000) reports that British scientists plan to link the UK's major computers in a single very powerful 'thinking network' known as The Grid. This massive connection project would allow computers in different research centres and technology companies to exchange computing tasks and access vast amounts of data without using search engines. It is said that it would be millions of times more powerful than the Internet, and be essential to some of the research projects of the future, which would generate enormous amounts of data that would need rapid processing. Although its designers envisage only good uses for The Grid, there have already been warnings that such a system brings closer the day when computers will take over the running of the world and make humanity redundant. For example, McKie quotes the statement of Bill Joy in *Wired* magazine that such developments could perfect extreme evil. Joy is the inventor of the Web language Java and chief scientist at

computer company Sun Microsystems.

Extreme evil may be an unlikely product, but on a more mundane note, it is certainly true that an interconnected world is susceptible to such pests as computer viruses, and the more dependent we become on technology the more vulnerable we will be to the damage they can do. Effective and reliable barriers to these hazards will need to be developed in parallel with the systems that encourage them.

### **More bandwidth, more risk**

The interconnected world will not be a static one, but rather one in which people tap into the infrastructure while on the move. The mobile information paradigm is already well underway, despite early warnings of possible microwave hazards from the use of mobile phones. This issue will become increasingly important the more these phones are used as Internet terminals. Bennett and Cane (2000) report that the UK Government seems about to impose one of the world's toughest sets of regulations for the mobile phone industry, for example by imposing new standards for radio masts and preventing the marketing of mobile phones to children. The industry is highly critical of these new proposals, but Public Health Minister Yvette Cooper is considering accepting the recommendations of a report on the safety of mobile phones, commissioned by the Government and headed by Sir William Stewart, former Government Chief Scientist. The report said that, on balance, the evidence so far did not suggest that mobile phone emissions and transmitters presented any risk, but that this area needs much more research and that children should be discouraged from using mobile phones. Earlier this year, the Government commissioned research into the potential health hazards of mobile phones, and asked the industry to meet half its

cost. It also instructed Professor Liam Donaldson, Chief Medical Officer, to draw up clear guidelines.

### **Conclusion**

We face the prospect of a connected society where access to pertinent information could become available to all, whether at home, at work, or on the move, through computing and communications technology. Certain elements of the proposed infrastructure need further work before this system can offer guaranteed levels of usefulness, efficiency and usability. But, equally importantly, there are ethical issues that need seriousness consideration, issues such as the right to personal privacy, the effective protection and transfer of intellectual property, and the dangers of putting computing to immoral use, ignoring hazards to health, or exploiting our dependency upon it.

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## Why nuclear reprocessing at Sellafield must stop

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### Helen Wallace presents the third and final article on Sellafield, this time outlining the risks of reprocessing

At the end of June, a historic proposal to end nuclear reprocessing in Europe was put forward by Denmark at this year's meeting of the OSPAR Commission, which is charged with preventing and eliminating marine pollution in the North-East Atlantic. The motion, supported by Ireland, Norway and Iceland, sought to end the two largest sources of discharges of radioactive waste into the sea and air in the world – the nuclear reprocessing plants at Sellafield in Britain, and La Hague in France.

The meeting voted to order both the UK and France to review current authorisations for radioactive discharges with a view to stopping nuclear reprocessing. However the countries both abstained from the vote, claiming that OSPAR had no right to intervene. This means the OSPAR decision is not legally binding but also leaves the UK and France politically isolated among their European neighbours.

If the UK continues reprocessing it will be breaking its commitments to end the radioactive pollution that reprocessing causes, particularly along the UK, Ireland and Nordic coastlines. And if reprocessing continues, the stockpiles of nuclear waste building up on land at Sellafield will continue to grow. The second in this series of three articles described some of the impacts on human health and the environment caused by the daily discharges of nuclear waste from Sellafield. This, the third and final article, outlines Sellafield's contribution to the growing nuclear waste crisis faced by Britain and the world.

#### **Nuclear waste at Sellafield**

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Sellafield has long been the nuclear waste dump of the world. Nuclear waste fuel has been sent there from Japan, Germany, Switzerland, Spain, Italy, Sweden and the Netherlands. BNFL has planned to send only one container of reprocessed nuclear waste back for every seven flasks of nuclear waste

fuel sent to Britain – in other words, to offer disposal as well as treatment. But these plans suffered a major setback in 1997, when planning permission for the first stage of an underground nuclear waste dump was refused by the Secretary of State for the Environment, John Gummer. Over £450 million of public money had already been invested in the plans.

For decades the nuclear industry had claimed it could 'dispose' of its nuclear wastes by burying them deep underground. But this decision and the evidence that led to it signalled the failure of the concept of "deep disposal" of long-lived radioactive waste.

It turned out that over time, Nirex expected its nuclear waste dump to leak and contaminate local drinking water, milk, crops and the Irish Sea. Many of the substances inside were expected to be released into the environment long before the radioactivity in them had decayed. The inspector at the Nirex inquiry concluded that Nirex's scientific knowledge was "inadequate". He also decided that the process of site selection had not been rational and that the site was unsuitable.

Despite this failure, the nuclear industry continues to create yet more nuclear waste, and reprocessing at Sellafield continues to increase the volumes. For every flask of nuclear waste fuel sent to Sellafield about 5 flasks of nuclear waste arise from reprocessing it. These figures don't include the nuclear wastes discharged into the sea and air from Sellafield, the contaminated reprocessing plant itself, or the stockpiles of unused uranium or separated plutonium at Sellafield (already enough to make about 10,000 nuclear weapons). Low-level nuclear wastes are dumped in a shallow-burial site at Drigg. But there is still nowhere for the high- or intermediate-level nuclear wastes to go.

BNFL is not concerned about creating a massive, dangerous, nuclear

legacy for future generations. But it is worried about the impact of the failure of "deep disposal" on its business. Now that BNFL's plans to keep the intermediate-level nuclear wastes from reprocessing in Britain have been scuppered, they have nowhere to "dispose" of these wastes. Current Government policy is therefore that they must be returned to the sender, creating thousands more shipments of waste.

BNFL is lobbying to get the policy that requires return of the Nirex wastes reversed – but this will turn Britain into nuclear waste dump for the world. A much better answer is to stop nuclear reprocessing today.

Stopping reprocessing would also avoid one of the biggest dangers associated with Sellafield – the possibility that its tanks of liquid high-level nuclear wastes could explode, creating a nuclear accident bigger than Chernobyl. These tanks require constant cooling to stop them from boiling. An accident like this nearly happened at Dounreay in 1998, when contractors severed a cable cutting off the power supply to the tanks. Reprocessing there has been shut down ever since.

Greenpeace believes that all existing nuclear wastes should be properly packaged and stored above-ground in managed, monitored and retrievable conditions, on the site of production. We cannot "dispose" of the nuclear legacy we have already created, but we can manage it responsibly. We can also stop making the problem any worse, by an immediate end to nuclear reprocessing and a rapid phase-out of nuclear power.

The Government will be consulting on its nuclear waste policy later this year. An end to nuclear reprocessing should be high on the agenda now that the UK has been isolated at OSPAR for continuing this dirty, dangerous and polluting practice.

*Dr Helen Wallace is a Senior Scientist at Greenpeace UK.*

See: <http://www.greenpeace.org.uk>

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# Conference Reviews

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## INES-2000

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Neil Morris

### Introduction

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I recently attended the INES-2000 conference “Challenges for Science and Engineering in the 21st Century” in Stockholm. I had previously worked with two colleagues from the Institution of Electrical Engineers (IEE) to prepare a paper “Engineering for a sustainable future” which we submitted to the conference. The IEE supported us and sponsored two of us to attend the conference in person. This short report is an account of my own personal experience of INES-2000.

INES (the International Network of Engineers and Scientists for global responsibility) was formed in 1991. It is an umbrella organisation for more than 90 societies worldwide, including SGR. INES-2000 was organised to further develop the themes of two previous INES conferences, “Challenges” held in Berlin in 1991 and “Sustainability” held in Amsterdam in 1996. Most of you will already be familiar with INES through its newsletter which is distributed to SGR members by e-mail.

### The conference

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Approximately 300 people attended the conference, representing a wide diversity of backgrounds and nationalities. The 5-day programme of events was based at two Stockholm University locations, the Royal Institute of Technology and the Royal Academy of Sciences. There were many distinguished speakers at the plenary sessions, including the chairman of INES Armin Teller and the famous Russian nuclear pollution whistleblower Alexander Nikitin. The people of Stockholm made us very welcome and invited us all to a reception with their Lord Mayor in the Stadhus building (where the Nobel prizes are presented).

A number of lectures were given by leading researchers in the field of sustainable development. For me, the most memorable was a lecture by Walter Stahel, from the Product-life Institute in Geneva. He asked us to consider this simple equation (which originated from Buddhist /Taoist teachings):

$$\text{Happiness} = \text{Goods/Wants}$$

For a long time we have been encouraged to find more happiness by increasing our goods (more wealth, more property, a better car), but the same advantage can equally be gained by pursuing a simpler lifestyle. Recycling materials and reducing energy consumption is in itself a rewarding activity, a win-win situation for individuals and for organisations. In the 21<sup>st</sup> century, any new technology development must be costed so that we take into account the risks that it introduces.

### Workshops

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Much of the work of the conference was conducted in 19 separate workshops. Each delegate was invited to choose the one that was most suited to their specialist interests. I chose the workshop on “Risk assessment of technologies in a larger context”, chaired by Per Sørup, head of an EU research centre in Seville. It is difficult to summarise a week’s discussion in this short article, but these are the themes that I found most compelling:

Democracy no longer controls the direction of technological developments. For many years the drivers of scientific progress have been curiosity-driven academic research and market-driven applied science. Governmental bodies like the EU now seek to promote a third driver, societal, policy-driven science. But how can the EU, which consists of 360 million people, practically represent the wishes of such a huge, diverse population?

Most democratic structures rely on a system where an elected body of representatives have only four or five years to implement their programme of work before they are subject to re-election, and perhaps replacement. Many of the important technological and environmental issues that must be addressed take decades to resolve. The precautionary principle is a recent example of an attempt to resolve this challenge by creating long-term “sustainable policies” which are designed so that they will not be overturned at the next election.

The precautionary principle, as it relates to the exportation of GM materials, was recently formalised as an international agreement at Montreal, in the “Cartagena Protocol on Bio-safety”. For the first time, we have agreement on practical measures to protect biodiversity against proliferation of GMOs. I learnt from some speakers who played a key role in the Montreal negotiations that the argument was very hard to win, but that the result was a good step forward.

Risk assessment of new emergent technologies has traditionally been performed by a group of specialists who are asked to report to government. This approach has lost credibility with non-scientists. Most people perceive that issues like BSE, the disposal of Brent Spar and the introduction of GM foods were not handled properly. It may be that the wrong group of specialists were consulted. To take another example, the veterinary scientists who declared that new animal antibiotics were safe did not have the right background to recognise that there may be implications to the safety of people that ate the meat from those animals.

We are experiencing a shift from reliance on “hard science” which does not respect “soft values” to a new paradigm where “soft scientific facts” interact with “hard public values”. From Heisenberg’s uncertainty principle to chaos theory we

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have seen a softening of science through the twentieth century. All new developments bring with them risks, some of which are unpredictable. The long-established figures for the probability of a nuclear power accident were cast into doubt when the Three-mile Island incident occurred, then completely rejected after Chernobyl. The calculations relied on invalid assumptions, for example that people always follow procedures and that we can predict all the possible failure scenarios. Whenever a new technology is introduced, we will always encounter at least one unexpected interaction, often with other remote systems. It is no longer enough to calculate the probability of a new potential hazard, we must establish if the hazard is plausible and act if we find that it is.

### **Conclusion**

I am delighted to have met so many people with a great depth of understanding of these important issues. Although my work has given me the opportunity to travel to many countries over the years, this was my first time at an international conference. It was also my first visit to Sweden which I now understand to be a model of a forward-looking, environmentally conscious society. A group of undergraduate science and technology students from Sweden and other countries took part in the conference and then reported back to us with an articulate statement of how they will work hard to become professionals who really care about a sustainable future.

It was heartening to see so many people from different cultures working together on the development of international understanding. For some time I have believed that the diversity of opinion and the wide range of professional values held by engineers and scientists is our great strength. My experience at INES-2000 reinforced that view. I am sure that INES will continue to grow and will become the

authoritative voice for concerned technical professionals.

The conference concluded with the release of this final statement:

“At the edge of the 21st century science and engineering have provided humanity with keys to knowledge and to improved quality of life. Despite these achievements, never before have so many people suffered from poverty and disease. Unfortunately, having the keys does not assure that the doors will be opened for all.

“The 20th century has awakened us to the opportunities inherent in organized science and engineering, but also brought us to the brink of utter devastation by developing ever more powerful weapons of mass destruction. Such weapons remain acute threats to humanity and demand a response from society in general and scientists and engineers in particular.

“Science and engineering are challenged by the complexities of nature and modern societies. Challenges also arise from the need to overcome poverty, assure sustainability and promote social learning and responsive innovation.

“Science and engineering have both positive and negative potentials and effects. To support the positive and prevent the negative consequences of science and engineering requires a culture of responsibility, which must embrace both individual scientists and engineers and the institutional framework within which they operate.

“Science and its technological applications should not be allowed to serve destructive ends. Scientists and engineers have a responsibility to society in seeing that science and its products are not misused. They also have a responsibility to engage in and promote beneficial uses of science and engineering.

“Meeting these complex and demanding challenges will require changes in the relationship of science to society, the institutional structure of science and engineering, and the ethical

standards and value orientations of scientists and engineers.

“Appropriate education in general, and education and research programmes in science and technology in particular, require corresponding changes and sustained support. It is also important to enhance communication about the process of science and its actual and potential outcomes, especially through improved linkages to policymakers as well as through dialogue with the public at large.

“Assuming society wants to use all resources of creativity, we call for equal gender opportunity at all levels of science and technology, especially at the decision-making level. Similarly, the inclusion of all cultural groups and sectors of society will enrich the diversity and responsiveness of science and engineering.

“New priorities have to be sought in applied research and development by asking: How can science and engineering contribute to satisfying basic human needs? How can the demands arising from public interest be met? Answers can be found through a wide dialogue of stakeholders. This implies in particular a change in the professional roles of engineers from disciplinary technical experts to broad-minded ethically and ecologically responsible agents of social and material change.

“We call upon scientists and engineers everywhere to exercise personal responsibility for ideas, products and services, and to contribute to building institutional responsibility. Such responsibilities are an important key to focussing science and engineering on constructive ends in the 21st century.”

Stockholm. June 18. 2000

Further details of the conference can be found at the INES-2000 Web site: <http://www.ines2000.org>

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# Book Reviews

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## **Hiroshima's Shadow: Writings on the Denial of History and the Smithsonian Controversy**

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**Kai Bird, Lawrence Lifschultz  
(Eds)**

**Pamphleteer's Press, Connecticut  
(1998) ISBN 0-9630587-3-8 (hb)  
lxxvii + 584 pp, \$39.95**

In the US there has long been a bitter controversy about the historical interpretation of the A-bombing of Hiroshima and Nagasaki. There is the "orthodox" view and a number of "revisionist" views, each of these terms being used by the other camp in a pejorative sense. In a few words, the orthodox view is that the A-bombing shortened the war and saved hundreds of thousands of US soldiers' lives. The revisionists claim that the orthodox view is not history but rather an acceptable gloss on the events, a gloss which conceals the less creditable aspects of the bombings. These aspects include:

\* revenge for Pearl Harbour and for Japanese atrocities

\* perceived need to justify the secret expenditure of \$2bn

\* failure, after the defeat of Germany became clear, to review the original purpose of the Project

\* bureaucratic in-fighting, including inter-service rivalry

\* desire to keep the Soviet Union "in place"

The principal revisionists are serious historians and scholars, who base their interpretations on detailed historical evidence – known events and relevant documents. They apply their scholarly scepticism to claims relating to all of the belligerents and not only the USA. Nevertheless, their challenges to orthodoxy touch raw nerves in the USA.

The Smithsonian Museum curators thought that fifty years was sufficient time for those nerves to

settle down. They planned an exhibition for 1995 which, in Lifschultz and Bird's phrase, "would reflect modern scholarship". The curators had misjudged. When the plans became known, opponents "roused themselves into a highly organized crusade in defense of the Hiroshima legend." The exhibition was, in effect, pulled.

This book is a collection of reprints of articles and documents on the whole of the A-bombing controversy, including a section on the Smithsonian debacle. Many of the most influential articles are collected together in this volume, making it very useful for anyone wishing to understand the events around 1945 and how we should continue the long struggle to deal with nuclear weapons. The articles contain many illuminating insights that expose the orthodox interpretation as cosmetic.

Even so, I believe that deep shadows remain. In this brief review, I will just mention one problem that is rarely addressed, and never, as far as I know, in detail. The orthodox interpretation maintains, unsurprisingly, that the A-bombings shortened the war. Many revisionist analyses dispute or cast doubt on this. That is, they say either that the A-bombings did not shorten the war, or that there is no evidence for shortening. But did the A-bombings *extend* the war?

I believe there are only a few scattered remarks in the literature that address this or similar questions. First, we must be clear on a point of language. The phrase "the A-bombings", or any similar phrase, focuses attention on the A-attacks themselves and their immediate aftermath, and away from the whole story – the hugely disruptive and expensive Manhattan Project and the many questions of strategy and diplomacy. When one considers the full picture, conclusions such as Stanley Goldberg's in this volume become plausible: "rather than shortening the war, the existence of the atomic

bomb program probably lengthened it."

Put very briefly, the argument for extension is that by early summer 1945 Japan had no allies, and its navy, air force and industry were largely destroyed. The USA was reading the Japanese diplomatic code and knew that there were significant voices in favour of ending the war. It insisted on unconditional surrender – up to time of the A-bombings. But after that, it quietly forgot the original Japanese sticking point – the position of the Emperor.

It is understandable that many US policymakers and ordinary citizens find it difficult to accept ideas that undermine the orthodox interpretation. Yet this makes it no less regrettable. In general, the revisionists have a serious and noble aim, which is not to attack the USA, but rather to look realistically at the events of the second world war. Admittedly the factors relevant to an understanding of the A-bombings do not flatter the USA participants, but neither do they show them as worse than the leaders of the other belligerents, all of whom were responsible for appalling brutalities. I suggest that the raw nerve that revisionists touch in the USA has as much to do with the US self-image of moral superiority as the A-bombings specifically.

In this regard the USA is not special. The elites and most of the citizens of all nations have a similar self-image of moral superiority. It is an illusion. The more objective analyses of scholars of world affairs need to be more widely understood. Then we might all be further along the road towards a world community which knew how to deal with nuclear knowledge. This book is a significant tool for this educative process.

*Alan Cottey*

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## Playing Safe: Science and the Environment

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Jonathan Porritt

Thames & Hudson, 2000, £6.95

Jonathon Porritt's book could almost have been written for SGR - or what SGR aspires to. He states: "there is no challenge more pressing than developing a genuinely more sustainable life for humankind. All else is secondary. He then goes on to ask whether science - so much at the centre of many important debates today - is in a fit state "methodologically, philosophically, politically - to assist us in making that necessary transition from today's unsustainable way of life to a genuinely sustainable future for the whole of humankind".

In the process of trying to answer this question and the many issues it implies, Porritt summarises some key scientific issues for sustainability: genetic manipulation, climate science, risk assessment and the accumulation of poisonous chemicals in the environment. He applies a six-point test to the state of science and its ability to contribute to a more sustainable future - and by implication teases out what needs to be done with, for and by scientists. The six tests are as follows.

Science needs to become more precautionary. Porritt assigns a "fair to good" mark here: this principle is now more widely applied (although still routinely ignored by those who advocate increasing "growth" to pay for technical fixes for environmental problems).

Science needs to be more participative. This a call for what Porritt calls "Civic Science" - in other words, scientists getting stuck into the democratic process - and "Citizen Science", meaning that science should enable citizens to have an input into scientific debate and decision-making.

Scientists need to become less arrogant. The "two cultures" approach, he says, is no longer acceptable. Neither is its implication: "trust me I am a scientist", or, even worse: "and I am superior in

knowledge to you". COPUS comes in for some criticism here. What is needed is for scientists to understand the public as much as the other way round.

Science will need to become more independent and more transparent - summed up in SGR terms by our "Open Science" concept. Porritt also identifies how the funding of science is deeply flawed by the preponderance of private sector funding and a lack of adequate freedom of information concerning important research findings that we have all paid for one way or another.

Scientists will need to become more compassionate.

Science will need to become more holistic.

The last two move into what I think is important territory: the philosophical and value-driven side of science, both in terms of how it is performed and how it is used, or exploited by vested interests.

Beyond the two culture analogy described by C P Snow, Porritt suggests another "two cultures" phenomenon that is now equally important, which divides those who see the Earth and its environment as part of an interconnected and continually interrelating whole (one where, to paraphrase, thermodynamics rules OK), from those (unfortunately most people) who do not share this world view. In the connectedness world view the overriding need for sustainability is "obvious". Humans are part of a system upon which they depend intimately and decisively - in the longer term. Outside of this view the environment is simply a resource bank to manipulate and exploit as we see fit.

Science and scientists should have a key role in getting this fundamental and necessary shift of perception across to decision-makers and, of course, the general public, suggests Porritt. But unfortunately scientists often work in disciplinary boxes that do not always enable the necessary connections nor take a sufficiently broad view. He puts forward that the debate about whether the role of humanity is that

of (temporary!) interloper on the world stage or that of "steward" or custodian of the Earth goes to the heart of our moral obligations - if any - to the biosphere.

Quoting Lynn Margulis: "the human move to take responsibility for the living earth is laughable - the rhetoric of the powerless. The planet takes care of us, not we of it. Our self-inflated moral imperative to guide ... or heal our sick planet is evidence of our immense capacity for self delusion. Rather, we need to protect ourselves from ourselves."

Whether or not we kill off most higher life forms in the biosphere through a range of human-induced possibilities (accumulated poisoning, rampant genetic mutations, climatic change, nuclear devastation), the point is that ultimately the biosphere will continue - in one way or another - without us. It has done it before and it has millions of years to do it again.

Porritt, arguing as a secular humanist, finds that the need to protect ourselves from ourselves lends new dignity to the role of custodian or steward. I would also argue that the use of the word Responsibility in SGR's name takes on this shade of the meaning: a responsibility for stewardship and sustainability, as custodians of human worth in the same breath as global worth.

Porritt argues that we should define human purpose in these terms.

I think that this book is an excellent, accessible introduction to the vital role science has to play, and how this role should evolve as part of the imperative to develop a sustainable way of life. It provides much food for thought for SGR as we explore what we should be trying to do.

SGR has already identified many of Porritt's suggested key issues for science. Two of these are our concept of Open Science and the need to research who funds UK science. We can be encouraged that we are on the right track. In my view we now need to be more engaged in the debate and raising the debate.

*Philip Webber*

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## The Politics of GM Food: Risk, Science and Public Trust

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Barbara Adam et al.

**ESRC Global Environmental Change Programme, Special Briefing No. 5, October 1999, ISBN 0-903622-88-2 (pb), 22 pp + insert, £10.00. Downloadable free from [www.gecko.ac.uk](http://www.gecko.ac.uk)**

This briefing is essential for those who wish to understand what considerations are relevant in the debate about genetically modified organisms (GMOs) and GM crops. Its authors are distinguished British social scientists. It offers a research-based analysis of how the British government has developed its policy on GM food and suggests how to escape from the GM impasse and how to avoid such problems in future.

The authors find that, if anything, public opinion is ahead of many scientists and policy advisers in its instinctive feeling for a need to act in a precautionary way and its sense that it may be unsound to rely only on the claims of "sound science". The research behind the briefing questions the widespread assumption that science alone can settle the safety and acceptability of GM agriculture. In the section on risk, the briefing discusses what assumptions frame scientific risk assessments, and points out that "absence of evidence" of risk is not the same thing as "evidence of absence".

Turning to public perceptions of GM issues, the authors find that it is wrong to assume that the public is ignorant of them, and that many people are open-minded in considering potential benefits as well as risks. The regulatory system in the UK has not yet addressed many issues of public concern, and continues to have significant shortcomings, despite recent improvements. The government, suggests the briefing, needs to receive a wider range of advice, and to handle it more intelligently; it should invite more than one "public interest" representative to serve on any of its expert committees. There

should be a genuine public debate on each issue of concern, which should at least face the possibility of deciding not to go ahead with a new technology. Governments should assess the benefits envisaged for GM strategies; nobody has yet been responsible for doing this. The briefing also identifies six rules for precautionary action.

The insert to the briefing contains the important policy recommendations of its authors, as follows. The Government should not leave it only to experts to settle the GM food issue. It should assess them as part of a sustainable national food and agriculture policy. It should call for a pause in current and proposed releases of GMs into the environment, even in current trials. Regulation of GM should go beyond whether a GM food is "acceptable"; it should address other questions addressed by the public, such as its necessity and its precautions against uncertainties. Its framework should be redesigned to be more precautionary, and its process should be much more broad-based, accessible, and transparent. The law should be changed to provide greater protection to the public from environmental hazards. Scientific institutions should encourage better understandings of public opinion by scientists, rather than deploring supposed public "irrationality" about science.

*Alan Mayne*

## Leaking from the Lab? The "Contained" Use of Genetically Modified Microorganisms in the UK

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**GeneWatch, UK, Buxton, Derbyshire. 54 pp.**

While there has been much public concern about the safety of GM crops and foods, the many risks from genetically modified microorganisms (GMMs) are relatively unknown. This comprehensive report therefore provides a very welcome and valuable introduction to this vital subject. Its comments are based on research results, including those of the Health &

Safety Executive (HSE) Advisory Committee on Genetic Modification, and it has 63 references to the relevant scientific literature, including HSE discussions and findings. It considers in turn: the risks of GMMs, the UK regulatory framework, the use of GMMs in the UK, GMMs in the environment, and revision of the EU Directive 90/219/EEC on the contained use of GMMs. It finally presents several conclusions and 16 recommendations.

The report points out that releases of GMMs occur on a daily basis, unmonitored, from factories and laboratories around the UK. The GMMs include viruses, bacteria, yeasts, and other fungi. "This form of pollution is escaping control measures and could increase dramatically in scale if proposed new regulations are agreed. GMMs are being used widely in the UK both for research purposes and by industry to produce enzymes, food additives and drugs." Although such GMMs are supposed to be restricted to the laboratory or factory, they are often accidentally released into the environment. The report details GeneWatch research into the use of GMMs, which includes a review of the scientific literature, a study of the public register of the use of GMMs in the UK, a survey of large-scale users of GMMs, and inquiries via officials and industry. "None of the companies using GMMs were prepared to supply details of what they were producing or releasing into the environment, their monitoring plans or data."

In the light of the research findings in this report, GeneWatch calls for the regulation of the contained use of GMMs to be aligned with other pollution controls in the UK. To achieve this and improve the regulatory system generally, it recommends: (1) obtaining more information; (2) improving risk evaluations; (3) monitoring and policing pollution from GMMs, and enforcement appropriate controls; and (4) making the regulatory system open and transparent.

*Alan Mayne*

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## Human Choice & Climate Change: Ten Suggestions for Policymakers

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### Guidelines from an International Social Science Assessment

Steve Rayner & Elizabeth L. Malone

Battelle Press, Columbus, OH, USA; distributed in Europe etc. by Roger Jones Publishing, PO Box 315, Harpenden, Herts. AL5 2ZD. 39 pp. Free.

The authors of this booklet look beyond the present climate change policy requirements to see what changes or adjustments to current policies could be made from a social science perspective. Ten specific suggestions are offered and presented to complement and challenge existing approaches to public and private sector decision making. They are based on a holistic approach, integrating climate change with social, economic, and technological changes and issues in general.

*Alan Mayne*

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## New & Renewable Energy: Prospects for the 21st Century

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Department of Trade and Industry. March 1999. 70 pp. Downloadable from [www.dti.gov.uk/renew/condoc](http://www.dti.gov.uk/renew/condoc).

And also: **New & Renewable Energy: Prospects for the 21st Century:**

### Conclusions in Response to the Public Consultation.

Department of Trade and Industry. January 2000. 20 pp. Downloadable from

[www.dti.gov.uk/renew/](http://www.dti.gov.uk/renew/).

The first of these publications is the UK Government's consultation document presenting its proposed policy for renewable energy, with special reference to the kinds of support mechanism which might be used to facilitate its development. The second publication presents the Government's response to the views submitted during the consultation. The consultation paper reports on the outcome of a review of the status and prospects of renewable sources of energy, commissioned by the Government, and considers possible ways of developing them.

Here, the Government reaffirms its commitment to such development and to ensuring that renewable sources make an increasing contribution to British energy supplies. It intends to work towards the aim of generating 10% of the UK's electricity supply from renewables by 2010. There is a new and growing R&D effort in renewable energy, with expenditure rising from about £10 million in 1999-2000 to £18 million in 2002-2002. In addition, the Government is proceeding with reforms that will improve the operation of energy markets and enable renewables to compete more efficiently. The types of renewable energy being considered are: solar, water, wind, biomass (wood and crops), and recycled waste.

The response to the consultation begins by outlining Government policy on new and renewable energy, covering aims, strategy, and targets. It then describes the

Renewables Obligation, which will require licensed suppliers to provide a specified proportion of their electricity supplies to their customers from renewable sources. It outlines plans for introducing a Climate Change Levy to come into effect in April 2001; there has already been a major consultation exercise on the Levy's design issues. The policy's supporting programme aims to provide action to tackle each of the key issues in parallel; its technological and non-technological requirements are discussed. Likely short-term to very-long-term (post-2025) R&D areas are listed. Finally, there is a chapter on regional planning and targets for renewable energy.

*Alan Mayne*

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## New Power for Britain: A Strategy for a Renewable Energy Industry

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GreenPeace, London. April 1998. 11 pp. ISBN 1-871532-19-1 (pb).

GreenPeace believes that the UK can meet all its electricity needs by harnessing three really "clean" renewable energy technologies: solar, wind, and wave: solar could provide two thirds of the UK's electricity. It considers far too limited the UK Government's aim to provide just 10% of electricity from renewables by 2010 [see above], and proposes that the Government put in place a political process that sets renewable targets for 2020 and 2030, which should lead to a phase-out of fossil fuels in the next 30 to 40 years.

*Alan Mayne*

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# Communicating with SGR

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## Letters

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Letters for inclusion in the Newsletter should be sent either by conventional mail to 'The Newsletter Editor' at the SGR address given below, or by email to [newsletter@sgr.org.uk](mailto:newsletter@sgr.org.uk) with 'SGR Letters page' in the title. Letters may be edited in the interests of brevity or clarity.

## Electronic Communications

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### sgrforum

You can correspond directly with the 200 or so SGR members who are online through 'sgrforum', our email discussion list, by sending an email to: [sgrforum@gn.apc.org](mailto:sgrforum@gn.apc.org)

If you are not already on the list, you will first need to subscribe. To do this, send an e-mail to:

[listproc@gn.apc.org](mailto:listproc@gn.apc.org)

with the following text:

```
subscribe sgrforum <firstname>
<lastname>
End
```

The subject line should be left blank.

### Other email contact

SGR has a number of specialist email addresses to use to contact particular people within SGR or for particular issues. These are given below.

## SGR online

*SGR has a set of specialist email addresses to help facilitate easy electronic communication*

Phil Webber (Chair)	<a href="mailto:PhilW@sgr.org.uk">PhilW@sgr.org.uk</a>	Tim Foxon (Secretary)	<a href="mailto:TimF@sgr.org.uk">TimF@sgr.org.uk</a>
Jenny Nelson (Treasurer)	<a href="mailto:JennyN@sgr.org.uk">JennyN@sgr.org.uk</a>	Stuart Parkinson (Vice Chair)	<a href="mailto:StuartP@sgr.org.uk">StuartP@sgr.org.uk</a>
Kate Maloney (Administrator)	<a href="mailto:KateM@sgr.org.uk">KateM@sgr.org.uk</a>	Alan Cottey (NCC member)	<a href="mailto:AlanC@sgr.org.uk">AlanC@sgr.org.uk</a>
Alan Mayne (NCC member)	<a href="mailto:AlanM@sgr.org.uk">AlanM@sgr.org.uk</a>	Newsletter	<a href="mailto:newsletter@sgr.org.uk">newsletter@sgr.org.uk</a>
Press Office	<a href="mailto:pressoffice@sgr.org.uk">pressoffice@sgr.org.uk</a>	IWOSP (see p20)	<a href="mailto:iwospuk@sgr.org.uk">iwospuk@sgr.org.uk</a>
Population, Consumption and Values Study Group		<a href="mailto:pcv@sgr.org.uk">pcv@sgr.org.uk</a>	
Ethical Careers Project	<a href="mailto:ethicsproject@sgr.org.uk">ethicsproject@sgr.org.uk</a>		
Web-site	<a href="mailto:webmaster@sgr.org.uk">webmaster@sgr.org.uk</a>	Conferences	<a href="mailto:conferences@sgr.org.uk">conferences@sgr.org.uk</a>
Publications	<a href="mailto:publications@sgr.org.uk">publications@sgr.org.uk</a>	Membership	<a href="mailto:membership@sgr.org.uk">membership@sgr.org.uk</a>

This edition of the Newsletter was edited by Vanessa Spedding with help from Kate Maloney. The opinions expressed do not necessarily represent those of SGR.

The next newsletter will have no particular theme. Articles are welcomed from both members and non-members. Please send articles (preferably in Word 97) to [newsletter@sgr.org.uk](mailto:newsletter@sgr.org.uk) or the new postal address for SGR: see below.

## Scientists for Global Responsibility

PO Box 473, Folkestone, Kent, CT20 1GS.    **\*\*PLEASE NOTE NEW ADDRESS\*\***

Tel: 07771 883696    E-mail: [sgr@gn.apc.org](mailto:sgr@gn.apc.org)    Web site: <http://www.sgr.org.uk/>

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# Events

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Every Saturday

## **Vigil Calling for the Release of Mordechai Vanunu**

Noon - 2.00 p.m., outside the Israeli Embassy in London at the junction of Kensington High Street and Kensington Court. Organised by and further information from the Campaign to Free Vanunu and for a Nuclear Free Middle East.

Tel: 020-7378 9324

E-mail: [campaign@vanunu.freereserve.co.uk](mailto:campaign@vanunu.freereserve.co.uk)

Web: [www.vanunu.freereserve.co.uk](http://www.vanunu.freereserve.co.uk)

4 - 5 November 2000

## **International Conference Against Depleted Uranium Weapons**

Manchester. Fees: £7.00 - £80.00. Organised by and further info from the Campaign Against Depleted Uranium.

Tel: 0161-834 8301/8176

E-mail: [gmdcnd@gn.apc.org](mailto:gmdcnd@gn.apc.org)

Web site: [www.cadu.org](http://www.cadu.org)

5 - 24 November 2000

## **Nature and Society – The Deep Ecology Movement**

Course at the Schumacher College, Dartington, Devon, led by Stephan Harding, George Sessions & Max Oelschlaeger. Fee: £1,450. Further info from Hilary Nicholson on 01803-865934.

E-mail: [schumcoll@gn.apc.org](mailto:schumcoll@gn.apc.org)

Web:

[www.gn.apc.org/schumachercollege](http://www.gn.apc.org/schumachercollege)

6 - 12 November 2000

## **International Week of Science and Peace**

Events to take world-wide on the theme of the title. For more information on how to be part of the UK contribution contact Alan Cottey on 01508 492464.

E-mail: [a.cottey@uea.ac.uk](mailto:a.cottey@uea.ac.uk)

IWOSP Web: [www.faessler.at.eos](http://www.faessler.at.eos)

11 November 2000

## **Bringing the International Year for a Culture of Peace to Your Community – A Day for Remembrance, Reconciliation and a Future without War.**

Further info from the Culture of Peace Committee.

Tel: 020-7697 0948

E-mail: [cultureofpeace@hotmail.com](mailto:cultureofpeace@hotmail.com)

25 November 2000

## **Children Cultivating Peace**

Conference at Friends House, London NW1 organised by the Peace Education Network. Fee: £5/£15. Contact Pax Christi, Christian Peace Education Centre, St Joseph's, Watford Way, London NW4 4TY.

25 November 2000

## **Disarmament Challenges – Small Arms to Star Wars**

Conference in Central London organised by the World Disarmament Campaign. Fee: £4/£6. Further info from Brian Cooper on 0131-447 4004.

1 - 3 December 2000

## **Policy Agendas for Sustainable Technological Innovation**

Third conference of the project: "Policies for Sustainable Technological Innovation in the 21st Century", organised by the Department of Innovation Studies, University of East London. For more info about the conference and POSTI, see [www.esst.uio.no/posti/cfp.html](http://www.esst.uio.no/posti/cfp.html) or call Gillian Perkinson 020-8223 4215.

E-mail: [g.s.perkins@uel.ac.uk](mailto:g.s.perkins@uel.ac.uk)

Web site: [www.uel.ac.uk/innovation](http://www.uel.ac.uk/innovation)

7 - 8 December 2000

## **European Conference for Peace and Human Rights**

Second consultation to prepare the proposed conference, at the European Parliament Brussels. Further info: The Bertrand Russell Peace Foundation.

Tel: 0115-978 4504

E-mail: [elfeuoro@compuserve.com](mailto:elfeuoro@compuserve.com)

7 - 26 January 2001

## **Responsible Science: From Control to Participation**

Course at the Schumacher College led by Christine von Weizsaecker, Mae-Wan Ho & Brian Goodwin. Details as above.

4 - 23 February 2001

## **The Market: Master or Servant?**

Course at the Schumacher College led by David Jenkins, Martin Khor & Wolfgang Sachs. Details as above.

8 February 2001

## **One World Works – for More than Profit**

Annual information and careers options event at Cambridge University. SGR has again been invited to participate. If you can help, or for further info, please contact Kate at the SGR Office.

E-mail: [KateM@sgr.org.uk](mailto:KateM@sgr.org.uk)

28 February 2001

## **Energy Globe - the Award for Sustainable Energy Initiatives**

Presentation ceremony in Linz, Austria. Further info from the Oberösterreich Energiesparverband.

Tel: + 43 732 6548 4386

E-mail: [energy.globe@esv.or.at](mailto:energy.globe@esv.or.at)

Web site: [www.esv.or.at/energyglobe/](http://www.esv.or.at/energyglobe/)

16 - 25 March 2001

## **National Science Week**

Organised by and further info from the British Association for the Advancement of Science.

Tel: 020-7973 3074

E-mail: [maria.roy@britassoc.org.uk](mailto:maria.roy@britassoc.org.uk)

Web site: [www.britassoc.org.uk](http://www.britassoc.org.uk)

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