



Knowledge

Common Heritage not Private Property

This special issue of the newsletter focuses on the recent SGR discussion meeting on *Knowledge*, with articles from all the speakers along with other relevant contributions. The meeting is reviewed on p19, but we begin below with an account of the origins of the Convention on Knowledge...

Another Knowledge, Another World

Dr. Mae-Wan Ho reveals the origins of the discussion paper “Towards a Convention on Knowledge”, and her hopes that “another science” may offer the key to “another possible world”.

Why ‘Knowledge’?

I am a scientist, and have been for nearly 40 years. For me as for most scientists, science is my first love, and I never thought I’d be doing many of the things I am doing today, least of all, promoting a Convention on Knowledge. So, what happened, and why ‘knowledge’?

The proximate cause for my downfall was getting invited to a conference, “Redefining the life sciences” in 1994, organised by my friends Martin Khor, Vandana Shiva, Tewolde Egziabhar and others. Instead of the usual academic talkshop, it became clear that redefining the life sciences was a matter of life and death for family farmers, especially those practising small-scale sustainable farming dependent on natural and agricultural biodiversity. Scarcely had they got over the devastation caused by the monoculture crops of the green revolution than the genetically engineered crops of the biotech revolution were staring them in the face and promising far worse.

I had left molecular genetics behind five years earlier in 1989, when all the scientific findings already indicated that genetic engineering was unlikely to work and could be dangerous.

The old picture of genetic determinism - with genes remaining almost constant in a static genome, determining the characteristics of the organism in linear chains of command - has had to be overwritten many times. Geneticists discovered huge complexities leading from the genes to perhaps a thousand times as many proteins as there are genes. Different combinations of proteins are active in individual cells at different times, depending on multiple levels of feedback from the environment. This feedback changes not just the function of genes, but the genes and genomes themselves. The genetic material of one species can be taken up and incorporated into the genome of totally unrelated species. Genetic engineering simply does not make sense given the ‘fluidity’ of genes and genomes in both structure and function. *(continued inside on p4)*



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News from SGR

A few words from the Chair..

Stuart Parkinson

In recent months there has been a growing catalogue of reasons to be concerned about the misuse of science and technology. In September, the World Summit on Sustainable Development in Johannesburg concluded with little in the way of new commitments to tackle growing environmental problems and increasing poverty. The autumn has seen the US and UK Governments threatening war against Iraq. And just before Christmas the UK Government gave indications that it would agree to be part of the US's highly questionable and highly expensive 'Missile Defence' scheme. Further, the signs are that the UK Government has already made up its mind to allow commercial planting of genetically modified crops, despite only just initiating a public debate on the subject. This is indeed an important time to be promoting the importance of peace, justice and sustainability in the practice and use of science and technology.

So it is very timely that SGR has a little good news. We have just been awarded a grant of £10,000 from the Polden Puckham Charitable Foundation (via the Martin Ryle Trust) payable over two years. This represents nearly 50% of the additional costs required to put into effect a two-year development plan for SGR to markedly increase our level of activity: mainly by expanding our ethics in science work and our lobbying activities, and recruiting

more members. The plan also includes employing a part-time Director to reduce our dependence on voluntary effort. SGR is also about to benefit from a personal bequest. The net result of all this is that the National Co-ordinating Committee have agreed that we can put into action the first year of this development plan. We are very grateful to the above-mentioned funders for this money. We will continue to make further funding applications so that we are able to fully finance the second year of the development plan.

We are also planning research projects on the military and corporate influence on science and technology. Pilot research has already begun in this area with the voluntary help of Dr Jon Goulding. We are awaiting the decision of a further funding application for some of this work.

But we haven't only been fundraising recently! On November 10th, to coincide with the first World Science Day for Peace and Development (WSDPD), SGR held a half-day conference, 'Knowledge - common heritage not private property'. As you may have gathered, the main focus of this issue of the newsletter is on this conference and the discussion around the draft Convention on Knowledge. We have also taken part in several other events: running ethical careers in science workshops at CND's 'Work and Welfare not Weapons' conference (see p20), 'Future Outlook' (Oxford University's ethical careers fair), an

'Ethics and Sustainability' course at Surrey University, and to a group of students at Imperial College; and given a lecture, 'Should we be scared of new technology?' at the French Institute. We have also produced written responses to the Government's Energy and Missile Defence consultations, issued a press statement concerning Iraq and weapons of mass destruction, and assisted the United Nations Association UK (among others) in the production of a leaflet putting forward the arguments against Missile Defence (enclosed - further copies are available from the SGR office). The SGR web-site, <<http://www.sgr.org.uk/>>, continues to expand, and copies of all the written material mentioned above can be downloaded from it. Copies of the material SGR presented as evidence to Chardon GM crop hearing will also appear shortly. The Chairman of this hearing has recently published his digest of all the evidence presented at the hearing, see <<http://www.defra.gov.uk/plant/pvs/gmrep1.htm>>.

This is an especially exciting time for SGR and I would like to take this opportunity to thank my colleagues on SGR's National Co-ordinating Committee and the Administrator, Kate Maloney, for all their hard work recently which is now beginning to pay off.

Stuart Parkinson

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ACKNOWLEDGMENTS

SGR thanks *The Science and Society Trust* and *The Martin Ryle Trust* for grants in support of the organisation of the November "Knowledge" meeting and the production of this special extended edition of the newsletter.

Eva Novotny

Readers may recall that in the March issue of this Newsletter we described plans for one or more farmers' conferences, aimed at providing farmers with information about the problems of growing GM crops and the benefits of sustainable agriculture, such as organic farming. After the costs of such an undertaking became clear, however, and also because other groups are doing that type of work, the NCC (including the GM Issues Co-ordinator, who initiated the plan) decided that such a conference would be beyond our financial means. Thus this plan has been abandoned.

The five reports constituting SGR's evidence to the Chardon LL Hearing are being prepared for placement on our web site.

In June, an urgent campaign was launched by Friends of the Earth to have letters sent to UK Members of the European Parliament to ask them to support strict legislation on traceability and labelling of GM food and feed. We responded by contacting nearly all UK MEPs, from all parties. The vote in the European Parliament favoured most of the legislation we had hoped for, although products from animals fed GM feedstuffs would not have to be labelled as being so derived. In November, EU agriculture ministers agreed to labelling; but it is proposed to set a high level, 0.9%, of permissible contamination by GMOs before labelling is required. This is unacceptable, especially as contamination levels as low as 0.1% are detectable. The UK is the only country to complain that 0.9% is too low a level.

Our evidence on animal feeding tests from the Chardon LL Hearing was sent to the Austrian Federal Environment Agency in response to a general appeal for such information.

Once again the Munloch Vigil, the group protesting against the farm-scale trial of GM oilseed rape at Munloch, Scotland, sent out an appeal for supporting evidence to be sent to the Scottish Parliamentary

Health and Community Care Committee. This Committee is taking a serious interest in possible harm from these crops and has agreed to investigate. We responded to this appeal.

During the first week of the government's Public Debate on GM crops, the Advisory Committee on Novel Foods and Processes (ACNFP) held an open meeting in Cambridge. SGR put a question based on an article issued by the Institute of Science and Society (ISIS website at www.i-sis.org.uk). This drew attention to the sharp rise, by a factor between 2 and 10, in food-borne illnesses in the United States between 1994 and 1999, i.e. spanning the time since the introduction of GM foods in that country. Of these illnesses, 81% of the 1999 figure were due to unknown causes; and of those illnesses for which the pathogen had been identified, 80% were due to viruses. In 1994, this figure had been only 9%. The United States is the country in which consumption of GM foods is highest. By contrast, in a study of food-borne illnesses in Sweden in 1998-1999, the statistics were similar to those for the United States in 1994. Some independent scientists have been warning that the viral elements inserted into GM crops could combine with viral fragments already present in a host and produce new pathogenic viruses. While there is no evidence that the increase in food-borne illnesses in the United

States results from the eating of GM foods, these facts should be a cause for concern and urgent investigation.

In an interview on BBC Radio 4, the Vice-President of the Royal Society, Prof. Patrick Bateson, reiterated the Society's pro-GM stance (even suggesting that some plants bought at garden centres pose a greater threat of spreading widely than do GM crops). SGR wrote to Prof Bateson to inform him of the experiences of North American farmers. Their practical findings, as well as published research in North America, are recounted in a major new report by the Soil Association, *Seeds of Doubt*.

In Saskatchewan, Canada, contamination by GM oilseed rape is so pervasive that non-GM production of this crop has been virtually impossible. The preface to this report summarises the situation in North America: 'The evidence we set out suggests that, in reality, virtually every benefit claimed for GM crops has not occurred. Instead, farmers are reporting lower yields, continuing dependency on herbicides and pesticides, loss of access to markets and, critically, reduced profitability leaving food production even more vulnerable to the interests of the biotechnology companies and in need of subsidies.'

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ALTERNATIVE CAREERS FAIRS

SGR has been invited to participate in three alternative careers fairs that are coming up next month:

- at Cambridge University on 13 February
- at Liverpool University on 26 February
- and at Bradford University on 27 February.

We are, of course, very keen to take part (and to promote our booklet, "An Ethical Career in Science and Technology?") but in order to cover all three effectively, we need some help from the membership.

If you're interested in volunteering and/or would like to know more, please don't hesitate to contact the SGR Office.

Elsewhere in the news...

Rotblat warns of "path to disaster"

The 1995 Nobel peace laureate, Professor Sir Joseph Rotblat, accused the US of developing a policy which regarded nuclear weapons as bad if in the possession of some states or groups but good if they were kept by the US for the sake of world security. The fact that it had signed the non-proliferation treaty and was legally bound to the elimination of nuclear weapons was being ignored. "The danger of a new nuclear arms race is real," Sir Joseph said.

Guardian 9/1/03

Anti-green author dishonest, says scientific panel

Bjorn Lomborg - the director of Denmark's Environmental Assessment Institute and a leading would-be debunker of mainstream scientific opinion on issues like global warming and overuse of natural resources - has been found guilty by a

Danish government committee of "scientific dishonesty". Professor Lomborg, whose work has been championed in the international press, was subject to a year-long investigation by the Danish Committees on Scientific Dishonesty.

Guardian 9/1/03

Blix needs months to search for Iraqi weapons

UN Weapons Inspector Hans Blix said his team need months to search for Iraq's weapons of mass destruction, but getting that time may depend on whether Saddam provides new evidence about nuclear, chemical and biological programmes. Mr Blix stressed the peaceful alternative is much cheaper than war. "We are perhaps 250 or 300 people on the inspection side. We cost about US\$80 million a year. If you take the armed path, you are talking about US\$100 billion, you're talking about 250,000 men, you're talking about a lot of

people killed and injured, a lot of damage," he said.

Independent 14/1/03

Star Wars deal is just a first step says Hoon

The UK Government has agreed to the US request to use the Fylingdales radar base in its missile defence scheme. Defence Secretary Geoff Hoon admitted that this was just a first step, and that subsequent steps would include basing interceptor missiles in the UK. Liberal Democrat foreign affairs spokesman, Menzies Campbell, asked: "What's the rush? This looks like a pre-emptive strike by the government, and undermines the whole process of consultation."

Guardian 16/1/03

Summaries by Patrick Nicholson

Another Knowledge, Another World

(continued from p1)

Naively, I thought that if I told the world what I knew, forces of reason, if not of good, would be set in motion, at least to prevent genetically engineered crops from being widely released into the environment.

Contrary to what's generally assumed, technology does not stand alone. It is inspired by the science, and in turn reinforces the science. Genetic engineering only makes sense if genetic determinism is true. They go together like hand in glove, which is why the pro-biotech establishment is clinging onto genetic determinism.

The forces of reason are also being obscured and held back by many other constraints.

There are serious conflicts of interests, both financial and non-financial such as prestige and career, and strong peer-pressure, to go along with the powers that be.

There's love of science for its own sake, however misguided that science may be. But most of all, I believe, it is

the way we know nature and the world when we are not trying to save the world. It is the knowledge system as a whole.

At a very early stage, I became aware that the debate on genetic engineering was no less than a global struggle to reinstate holistic knowledge systems and sustainable ways of life that have been marginalized and destroyed by the dominant, unsustainable monetary culture.

This task has become all the more urgent as the earth has been brought to the brink of extinction by the excessive uses of fossil fuels, and 'weapons of mass destruction' - nuclear, chemical, biological, and the latest, robotic and star wars - are back on the global agenda in the so-called 'war on terrorism'.

Wars and conflicts have the same source, ultimately the failure to see nature whole; seeing the world as separate from us, individuals as isolated and constantly competing, one against all, all against nature. It comes from seeing organisms,

including human beings, as machines, and the wonderful diversity of animals and plants as so many different instruments for the survival of the meanest and the richest. Living organisms including human genes and cell lines are to be patented for commercial exploitation.

The monetary culture is profoundly pathetic. It threatens to obliterate all the qualities of life by reducing them to euros or dollars. The means of exchange has become the ultimate end that subverts and flattens all human relationships and social values.

When Thatcher, and now Lord Sainsbury, gauges scientific output in 'spin-off' companies and their market value, that's when we should worry about the quality of science.

Bad science endangers lives, and the more profit to be made, the more dangerous it is. Biomedical researchers have been caught peddling fraudulent cures and killing patients while profiting from stock-market hype of spin-off companies created at public expense.

Knowledge itself under threat

Knowledge itself is under threat in many ways. Proprietary databases and archives are being established to restrict access to genome sequences and other information on genes and proteins, and to published scientific papers, all of which severely hinder scientific research.

Globally, the new Trade-Related Intellectual Properties (TRIPS) regime of industrialised nations, which includes patents of organisms, human genes and cell lines, is being imposed on the rest of the world through the World Trade Organisation (WTO), as part of a relentless drive towards economic globalisation. The TRIPS regime is an unprecedented privatisation of knowledge. It has also led to widespread biopiracy of indigenous knowledge and resources, threatening local biodiversity and the livelihoods of indigenous communities.

Farmers in Canada and the United States who found their fields contaminated by patented crop genes have been ordered by the courts to pay compensation to Monsanto. This is a foretaste of the corporate serfdom that will be imposed on all of us if we don't fight it now. It is crafted through the economic globalisation of the WTO, World Bank and International Monetary Fund, which is widely acknowledged to be the major cause of poverty, social disintegration and environmental degradation over the past decades. It is obstructing real attempts to reverse the trends, and to implement a global agenda for sustainability.



The 'academic-industrial-military complex' engineering life and mind

The threat to knowledge is much deeper than the enclosure of the intellectual commons, and all the other consequences that follow.

Successive governments have sold science and scientists to the corporations in the misguided quest to exploit science for wealth creation. Science and scientists are being subverted to a corporate agenda that ensures the survival of the meanest and fattest corporations, so they can become ever better at exploiting the masses for further gain.

Under the banner of the 'free market' and 'free choice', we are losing our right to self-determination and self-sufficiency in every way: our food, health, social mores, the way we choose to live and most seriously of all, our right to think differently from the corporate establishment. An emerging 'academic-industrial-military complex' is threatening to engineer both life and mind.

Corporations have taken over the public funding agencies, to determine which kinds of scientific research get funded. Independent science and scientists are fast becoming extinct. The government and the Royal Society – the society of top scientists in the UK if not the world – got together with a transmogrified PR company funded by the food industry to produce guidelines to determine which scientific findings get reported, and what scientists can say to the media. The Science Media Centre, set up to feed the media with the 'correct' scientific information, was caught trying to suppress a BBC drama that attempted to draw attention to horizontal gene transfer, the most insidious danger of genetic engineering.

The UK national debate on GM is turning into a farce, with the head of the Food Standards Agency openly supporting GM and attacking organic agriculture based on prejudice and hearsay, completely ignoring the wealth of scientific evidence on the success of organic, sustainable agriculture around the world.

There is still no open scientific debate on the hazards of genetic engineering within the UK.

"Another world is possible"

"Another world is possible" was the rallying cry of the fifty thousand who gathered in Porto Alegre in February for the Second World Social Forum (WSF), to voice unanimous opposition to the present economic globalisation and to call for alternative models of world governance and finance.

But almost no one targeted the predominant, reductionist knowledge system that has provided the intellectual impetus for this globalisation as well as the instruments of destruction and oppression.

At a workshop during the WSF, I happened to be sitting next to Paul Hawken, who wrote *The Ecology of Commerce* and other books, in which he proposed a new form of business that places primary emphasis on regenerating nature, for nature is the ultimate capital of commerce. He told me he had discussed the idea of a "Convention on Corporate Responsibility", which he confessed, could be an oxymoron.

But it occurred to me there and then, why not a Convention on Knowledge?

I discussed it briefly with Martin Khor, Director of the Third World Network, and soon after returning home, typed the first draft into my laptop. And, the rest, as they say, is history.

I was overjoyed and surprised by the enthusiastic response, first from fellow scientists and then, most importantly, from third world and indigenous peoples' representatives.

Let me take the opportunity to thank all those who have responded to improve the draft, and to add substantial texts and comments that I have tried to accommodate, if not incorporate. In particular, I want to thank SGR for playing such a major role in publicising the paper, collating the comments and organising this first conference to discuss the draft.

Phil Webber has kindly given me a preview of the comments, so I could at least explain, if not defend myself, as I do feel responsible for all the defects in the document.

First of all, it was never my intention to produce a legally binding

international Convention, as that's the surest way to kill it. Look what's happening to the Kyoto Protocol, the Cartagena Biosafety Protocol, the Bioweapons Convention, and every other international agreement.

This Convention on Knowledge belongs to the global civil society. It is meant to bring together all the seemingly disparate issues that concern knowledge or which arise from knowledge, to serve as the focus of a concerted global campaign to reclaim all knowledge systems to the service of public good, and to create another possible world.

I also believe that another science is possible, that it may be the key to another possible world.

Much of the inspiration for the Convention came from knowing that there are so many people, like Paul Hawken and Martin Khor, at opposite ends of civil society, all deeply committed to "another possible world" that's more equitable, sustainable, peaceful and just; and have already contributed so much in that direction.

As a scientist, I also know that we have all the means at our disposal to help build that possible world, and we can make major contributions as scientists.

More importantly, there is another science on the horizon, emerging from within the tradition of western science, which could offer a radically different vision of life.

I mentioned the fluid genome. That is part and parcel of the shift in scientific vision, from the mechanistic towards the organic, from reductionist to holistic, that has been happening across the disciplines: the mathematics of chaos and the science of complexity, non-equilibrium thermodynamics, quantum physics of coherent states, to name but a few.

Would a different science transform the meaning and texture of our life? I think so. I started doing science as a typical biologist and biochemist, schooled to fixing, pinning, pulping and homogenising until no trace is left of the biological organisation that I was supposed to be looking for. We end up with a graveyard of information on the molecular nuts and bolts, but nothing to enable us to

understand what makes the organism whole.

It was dissatisfaction with this approach that started my scientific odyssey of 30 years, falling in and falling out of many disciplines until I found what I call, the physics of organisms. It is, in many ways, an extension of the work and vision of British mathematician-philosopher Alfred North Whitehead, biochemist and later scholar of Chinese science, Joseph Needham and others who were to form the Theoretical Biology Club in Cambridge in the first half of the last century.

There are many colleagues who share in this new vision to varying degrees. Some of us recently met at a conference organised by my long time collaborator, Franco Musumeci, ex-nuclear physicist turned biophysicist and associate professor in the engineering faculty of Catania University, Sicily. The conference received enthusiastic support from many Departments within Catania University and its administration, and from all levels of the Italian government, the local municipal to provincial, right up to the national. We were showered with gifts, as local businesses also donated generously in kind.

Afterwards, a number of us proposed a M.Sc. programme on "Organic Physics": how the physical sciences and engineering can contribute to understanding life, rather than the other way around: how life can be understood in terms of physics and chemistry. I invite anyone interested to get involved in such a programme. It will be earth shaking; scarcely a month after our conference, Mount Etna erupted again.

A few days ago, I attended a workshop organised by The Living Rainforest, a beautiful mini-Eden project in Hampstead Norreys near Newbury. I spoke about my personal quest for another science that brings back all the hallmarks of life – spontaneity, freedom, consciousness and love – that have had no place within the mechanistic paradigm.

Our magazine, Science in Society, is dedicated to developing the new perspectives in earnest while challenging the old. Please subscribe and write for us. The current issue 16

covers a lot of what I have been talking about, including an article on how our Convention paper was launched at the Earth Summit, appropriately, at a session linking traditional knowledge and science.

The highlight of the session was a talk by a remarkable Maori healer, Kereopa, who is working with a scientist "to bring Maori medicine to the modern world". When asked how western scientists and indigenous healers like himself could work together, he said,

"You cannot stay in your university and keep on sciencing and sciencing. The future is up to you."

I have indeed found it impossible to stay in my university, or to keep on sciencing and sciencing within the mechanistic paradigm. For me, it has always been, and will always be, sciencing with love.

Dr Mae Wan Ho is the Director of the Institute of Science in Society.

A fully referenced version of this paper is posted on the I-SIS members' website <<http://www.i-sis.org.uk>>.



Science, Knowledge, Wisdom and the Public Good

Nicholas Maxwell argues that we need a revolution in the aims and methods of academic inquiry

What kind of science – or, more generally, what kind of academic inquiry – can best contribute to the public good? That is the question I tackle in this essay.

I consider two possible answers to this question, two rival conceptions of inquiry, which I call “knowledge-inquiry” and “wisdom-inquiry”.

The basic idea of knowledge-inquiry is simply this. First, knowledge and technological know how are to be acquired; then, secondarily, they can be applied to help solve social problems. On this view, a sharp split must be maintained between the humanitarian or social aims of inquiry, and the intellectual aim (acquisition of knowledge). The basic method is to permit into the intellectual domain of inquiry – into academic texts, journals, lectures and seminars – only claims to knowledge, and factors relevant to the assessment of such claims: observation, experiment and argument. Everything else must be excluded. In particular, the intellectual activity of articulating problems of living, and proposing and assessing possible solutions, possible actions, must be excluded from inquiry: such intellectual activity would involve the advocacy and assessment of such things as human needs, values and aspirations, and political policies, programmes and philosophies. All this must be excluded from the intellectual domain of inquiry, to ensure that the search for genuine, objective knowledge does not degenerate into the production of mere propaganda and ideology.

The core component of this view is a conception of science, which I shall call “standard empiricism”. This asserts that in science laws and theories, claims to knowledge, are to be assessed impartially with respect to the evidence, no permanent assumption being made about the universe independent of evidence (and certainly not in defiance of evidence). Standard empiricism imposes an even more severe line of demarcation between science and everything else: in order to enter into the intellectual

domain of science, an idea must be empirically testable¹.

Not everything that goes on in academia conforms to knowledge-inquiry. For one thing, anti-rationalist, romantic ideas, and what Isaiah Berlin has called the “Counter-Enlightenment”², have been influential in such fields as cultural studies, the history and sociology of science, and so-called “continental philosophy”. It may even be that academia, as it exists today, is a kind of confused mixture of what I am calling knowledge-inquiry and wisdom-inquiry (see below). Nevertheless, overwhelmingly, knowledge-inquiry is dominant³.

Knowledge-inquiry is, nevertheless, damagingly irrational, in a wholesale, structural way, when judged from the standpoint of promoting the public good.

In order to be rational, inquiry must at least observe the following four absolutely elementary, banal, entirely uncontroversial rules of rational problem solving.

(1) Articulate, and try to improve the articulation of, the problem to be solved.

(2) Propose and critically assess alternative possible solutions.

(3) When necessary, break up the basic problem to be solved into a number of preliminary, simpler, analogous, subordinate or specialized problems (to be tackled in accordance with rules 1 and 2), in an attempt to work gradually towards a solution to the basic problem to be solved.

(4) Interconnect attempts to solve basic and specialized problems, so that basic problem solving may guide and be guided by specialized problem solving⁴.

Knowledge-inquiry, as it exists today, puts rule (3) into practice to splendid effect. It is this that creates the multitude of disciplines, sub-disciplines, sub-sub-sub-disciplines, that go to make up modern science, and modern academia more

generally⁵. Disastrously, knowledge-inquiry violates, rules (1), (2) and (4).

In order to see this, consider the nature of the problems that, fundamentally, we need to solve in order to promote the public good. These are, fundamentally, problems of living, problems of action, not problems of knowledge or technological know-how. Even when new knowledge or technology is needed, as in medicine or agriculture, it is always what this knowledge or technology enables us to do that produces what is of value to us in life. It is always what we do (or refrain from doing) that solves our problems of living.

Furthermore, in order to solve our most urgent problems of living, we need, quite fundamentally, to discover how to resolve our conflicts and problems of living in more just, cooperatively rational ways than we do at present. There are of course degrees of cooperativeness, from annihilation of the opposition, at the extreme violent end of the spectrum, via threat of annihilation, threats of a less extreme kind, bargaining, appealing to some procedure to decide the issue such as tossing a coin or voting, to cooperative rationality at the other end of the spectrum, all those concerned seeking to discover that resolution of the conflict that is of most value, does the best justice, to all those concerned. Acting cooperatively is only feasible and desirable up to a certain point, for all sorts of reasons. Nevertheless, in our violent and unjust world, there is room for rather more cooperative tackling of conflicts of a kind that is both feasible and desirable (to put it at its mildest).

Put together the above four rules of reason, and the point that our problems are, fundamentally, problems of living, problems of action, and we are led to conclude that the intellectually fundamental tasks of a kind of inquiry rationally devoted to promoting the public good must be to:

(1) Articulate, and try to improve the articulation of, our most urgent,

fundamental problems of living (individual, social, global).

(2) Propose and critically assess alternative possible solutions – alternative possible actions, policies, plans, political programmes, philosophies of life.

But it is just these two intellectually fundamental tasks which knowledge-inquiry cannot perform, and must exclude from the intellectual domain of inquiry, as we have seen above. Just that which a kind of inquiry devoted to promoting the public good most needs to do, cannot be done. Knowledge-inquiry violates rules (1) and (2) of rational problem solving – the most basic rules of reason conceivable. Rule (3), as we have seen, is put splendidly into effect, but rule (4) is violated as well. Because tackling of problems of living cannot go on within knowledge-inquiry, at a fundamental level, the rule (4) task of inter-connecting fundamental and specialized problem-solving cannot go on either. In short, three of the four most elementary, uncontroversial rules of reason conceivable are violated in a wholesale, structural fashion.

And this gross irrationality, built into the intellectual-institutional structure of academic inquiry, has profoundly damaging social, humanitarian consequences. It means that knowledge is pursued in a way that is dissociated from any more fundamental intellectual concern to help humanity discover how to resolve its conflicts and social problems in more cooperatively rational ways.

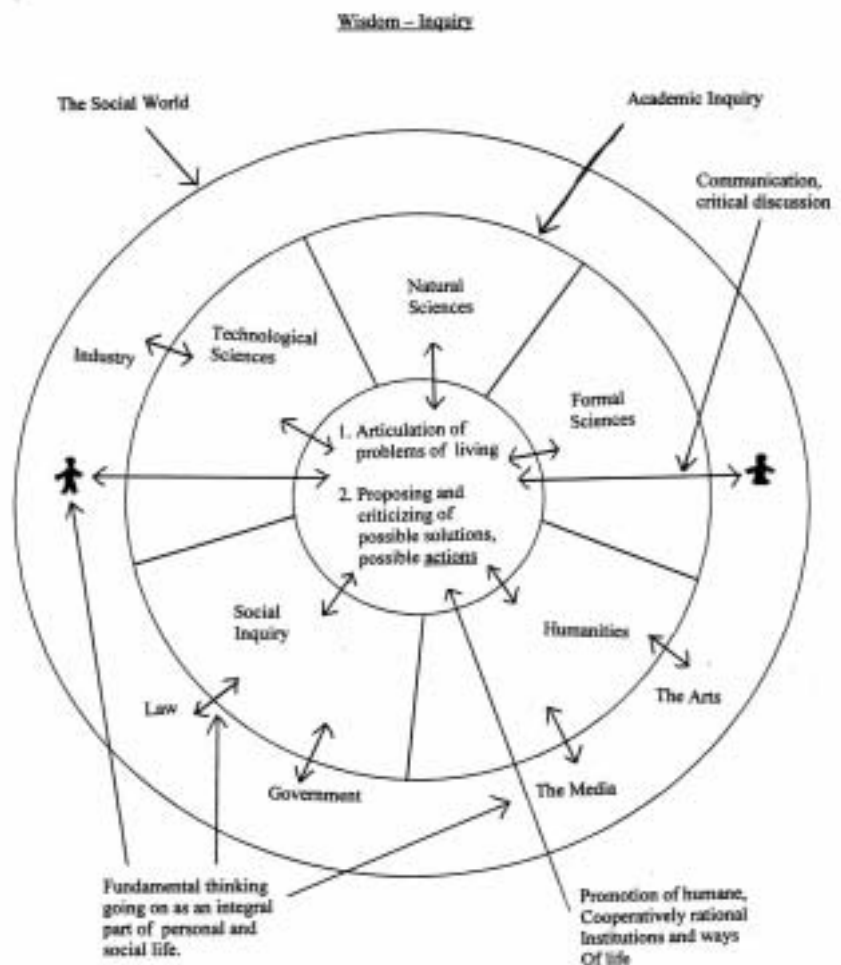
Scientific knowledge and technological know-how have enormously increased our power to act. In endless ways, this vast increase in our power to act has been used for the public good – in health, agriculture, transport, communications, and countless other ways. But equally, this enhanced power to act has been used to cause human harm, whether unintentionally, as in environmental damage (at least initially), or intentionally, as in war. It is hardly too much to say that all our current global problems have come about because of science and technology. The appalling destructiveness of modern warfare

and terrorism, vast inequalities in wealth and standards of living between first and third worlds, rapid population growth, environmental damage – destruction of tropical rain forests, rapid extinction of species, global warming, pollution of sea, earth and air, depletion of finite natural resources – all exist today because of modern science and technology. Science and technology lead to modern industry and agriculture, to modern medicine and hygiene, and thus in turn to population growth, to modern armaments, conventional, chemical, biological and nuclear, to destruction of natural habitats, extinction of species, pollution, and to immense inequalities of wealth across the globe. The successful pursuit of knowledge and know-how, dissociated from a more fundamental concern to help humanity learn how to resolve its conflicts and problems of living in more just, cooperatively rational ways, is almost bound to lead to such adverse consequences. And priorities of scientific research are

unlikely to reflect the priorities of human need. Science without wisdom is a recipe for disaster⁶.

What, then, in broad outline, would academic inquiry be like if it was rationally designed and devoted to helping humanity make progress towards a good world? I now give a sketch of this kind of inquiry, which I shall call “wisdom-inquiry”. There is nothing arbitrary about this sketch. It is arrived at by modifying knowledge-inquiry just sufficiently to ensure that the above four rules of reason are all implemented.

At the heart of wisdom-inquiry there is the intellectually fundamental activity of (1) articulating problems of living, and (2) proposing and critically assessing possible solutions – possible increasingly cooperative actions (policies, political programmes, institutional changes, philosophies of life). This intellectually fundamental activity is undertaken by social inquiry (see diagram below). The basic task of



social inquiry is to promote more cooperatively rational resolving of problems of living in the social world: acquisition of knowledge of social phenomena is a subsidiary task. Wisdom-inquiry also (3) tackles a vast mass of more specialized, subordinate problems of knowledge and technological know-how, pursued by the natural, technological and formal sciences, but (4) such specialized problem-solving is interconnected with fundamental problem-solving, so that each may influence the other (see diagram). Wisdom-inquiry acts as a kind of people's civil service, doing openly for the public what actual civil services are supposed to do in secret for governments. According to this view, academic inquiry must have just sufficient power (but no more) to retain its independence from government, industry, the press, public opinion, and other centres of power and influence in the social world. Wisdom-inquiry learns from, seeks to educate, and argues with the great social world beyond, but does not dictate. Academic thought may itself be regarded as a specialized, subordinate part of what is really important and fundamental: the thinking that goes on, individually, socially and institutionally, in the social world, guiding individual, social and institutional actions and life. It is vital that the relationship between socially active thought and academic thought itself puts rule (4) into practice, each influencing the other.

Granted that academic inquiry as it exists at present really is as grossly and damagingly irrational as I have argued it is, the question arises: How did this come about? The answer lies with the Enlightenment of the 18th century, which sought to develop social inquiry as social science rather than social methodology or social philosophy. The philosophes of the Enlightenment had the magnificent idea that it might be possible to learn from scientific progress how to achieve social progress towards an enlightened world. In order to implement this idea properly it is essential to (a) characterize correctly the progress-achieving methods of science, (b) generalize these methods properly and (c) apply them to the task of making social progress

towards a good world. This involves, first, recognizing that standard empiricism is untenable: science is impossible unless basic assumptions are made concerning the knowability and comprehensibility of the universe. The fundamental aim of science is deeply problematic; science needs to represent its aims and methods in the form of a hierarchy, aims becoming increasingly unproblematic as one goes up the hierarchy, in this way a framework of fixed aims and methods being created within which more problematic aims and methods can be improved with improving knowledge. This interplay between improving knowledge and improving aims and methods (improving knowledge about how to improve knowledge) is the crux of scientific rationality, and the key to the success of science⁷. It is this conception of scientific method that needs to be generalized and applied to the task of making social progress towards a good, civilized world – a task with a notoriously problematic aim. The outcome would be wisdom-inquiry, with social inquiry pursued as social methodology or social philosophy.

Unfortunately, the Enlightenment got all three steps, (a), (b) and (c) wrong. The philosophes upheld versions of standard empiricism, and sought to develop social inquiry as social science. This was developed throughout the 19th century, and built into academia in the 20th century with the creation of departments of social science. The upshot is what we have today, damagingly irrational knowledge-inquiry.

We urgently need to bring about a revolution in the aims and methods of academic inquiry, so that wisdom-inquiry is put into academic practice, and a more intellectually rigorous and humanly desirable kind of inquiry is developed than that which we have at present⁸. The fundamental aim would be to promote wisdom, help humanity create a wiser world. But what, it may be asked, do I mean by “wisdom”? Elsewhere I have defined wisdom like this:

“[Wisdom is] the desire, the active endeavour, and the capacity to discover and achieve what is desirable and of value in life, both for oneself and for others. Wisdom includes knowledge and

understanding but goes beyond them in also including: the desire and active striving for what is of value, the ability to see what is of value, actually and potentially, in the circumstances of life, the ability to experience value, the capacity to use and develop knowledge, technology and understanding as needed for the realization of value. Wisdom, like knowledge, can be conceived of, not only personal terms, but also in institutional or social terms. We can thus interpret [knowledge-inquiry] as asserting: the basic task of rational inquiry is to help us develop wiser ways of living, wiser institutions, customs and social relations, a wiser world.” (Maxwell, 1984, p. 66.)

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Notes

1. This is in essence Karl Popper's famous criterion of demarcation between science and metaphysics: in order to be scientific, a theory must be falsifiable. See, for example, Popper (1963, ch. 11).
2. Berlin (1980, pp. 1-24).
3. For evidence in support of this claim see Maxwell: (1984, ch. 6); (1998, pp. 38-45); (2002a, pp. 240-1).
4. For further rules of reason, and further discussion of the nature of rational problem-solving and aim-pursuing see Maxwell (1984, chs. 4 and 5).
5. In order to get a sense of just how endless is the maze of specialized sub-sub-sub-disciplines in a field such as physics or chemistry, one need only consult a volume of *Physics Abstracts*.
6. For a detailed discussion of the harmful humanitarian consequences of the irrationality of knowledge-inquiry see Maxwell (1984, ch. 3).
7. See Maxwell (1998).
8. For very much more detailed presentations of the argument see Maxwell: (1976); (1984); (1998); (2002a); and (2002b).

Responses to the Convention on Knowledge

Philip Webber summarises feedback received by SGR on the Convention

At the time of the “Knowledge” meeting, SGR had received about a dozen responses to its call for feedback on the draft Convention on Knowledge (CoK). Responses came from the United States, Australia, and the UK, and included many lengthy submissions. This article is an attempt to summarise the comments made by the various respondees. Readers should therefore note that the views presented here do not necessarily coincide with those of the author. In the text that follows, quotes from the CoK appear in italics.

There was considerable (practically unanimous) consensus about the main issues raised by the CoK and there was broad sympathy with the idea of the Convention.

Globalisation

It was felt that globalisation - or, more specifically, economic globalisation - is NOT the major cause of poverty, social disintegration etc. Rather, globalisation is a phenomenon and we need to be clear about what problems we see in specific terms - e.g. inequitable distribution of wealth, dominance of WTO models of market regulation (or lack of it). What is needed is a different form of globalisation or approach to market forces. Monbiot and Goldsmith for example talk of wanting “Market Freedom”; Zac Goldsmith and others of “counter development”.

Most believed that the ways in which knowledge, science and technology are currently being exploited are profoundly damaging and misguided.



For example, neo-colonisation through economic dominance and trade agreements.

Indigenous Knowledge

Almost everyone commented on this topic. It was felt that we need to respect all forms of knowledge but that we also have to realise that different knowledge systems might actually be in conflict. There might need to be choices about the kind of “knowledge system” that we can go along with. Indigenous knowledge is not automatically better than developed knowledge; all forms of knowledge are vital to achieving sustainable development.

Rather than blaming science for promoting - for example - monoculture systems (when it might be more accurate to blame an unrestrained market and corporate exploitation) it was felt that we should urge the adoption of genuine collaborations between traditional and modern and use of appropriate technology.

Definitions

The above comments led into a call for some definitions. What was meant by knowledge? By knowledge do we mean truth? (The Convention draft asks that knowledge be “truthful”). Or do we perhaps mean wisdom? If it is truth we are talking about we cannot limit its consequences.

Some consequences lie in the realm of application. If knowledge enables us to make a hammer then Knowledge of itself cannot deny the possibility that the hammer may be used for good (building a house) or bad (torturing someone).

We cannot argue that (Western) science is not neutral or value free and ask for another kind of science. The key issue is how that knowledge is used or applied (the hammer analogy again).

Accessibility to knowledge

The point was made that access to many forms of knowledge requires

extensive study. Thus making knowledge accessible is not straightforward.

“Knowledge should enable us to live sustainably with nature, western science needs to transcend the ruling paradigm to holistic ecological perspectives ... shift to sustainable ways of life. Recognise harmonious, symbiotic, mutualistic relationships that sustain ecosystems.”

There was considerable scepticism about “changing the world for the better”. We may know what a better social (human) world might be like but do we really know what a better ecological world would be like?

The biological (Gaia or not) world is very robust and has lasted 100,000 times as long as social and creative human beings. For Darwinians nature is not harmonious but the stage for a continuous struggle. A dynamic state of flux. Was the world of the dinosaurs better (less wars)?

Gaia and the world as a super organism

Gaia is a geo-physiology that maintains the Earth in a dynamically stable state, but are self-stabilising modes automatically “better”? Why is the current Gaian solution to evolve an organism to burrow into the earth and burn the carbon buried millennia ago? As responsible humans we should have a view about what stable system we are aiming for. Mars and Venus have stable ecosystems but neither is the type of ecosystem that we would want as humans.

Corporate Science

Excessive exploitation and profit making is seen as a problem. However, the problem may be most acute in certain areas - for example biomedical research. In areas such as cancer research the point was made that scientists still have independent funding and work for higher societal benefit (finding “cures” for cancer). Generally a case emerges of needing to deal with issues of independence and influence on a case-by-case basis

and not to over-generalise from one strong example.

Use of science for destructive ends

It is the case that many scientists believe that working for the military is ethical as it is part of their country's "self defence" – for example scientists developing nuclear and other weapons systems in developing countries. We have a long way to go to convince individual scientists to desist from such work for the greater good (especially when the major world powers do not provide a good example).

Privatisation of knowledge

It was felt that in some cases this is necessary – for example music copyright and software - otherwise there is no protection for the value of new technological intellectual and artistic development. There was strong support for a ban on patenting of the human genome etc. But again there was a perceived need to be specific about what is meant and not to over-generalise.

On the need to shift from reductionist to holistic knowledge

Can holistic science – or knowledge - really transform the meaning of our lives? Or create a social reality that serves spiritual, emotional and physical needs of everyone? There was considerable doubt about this section.

Let us ask for something simpler – that science not be used destructively.

“The mechanistic conception of nature has been found to be thoroughly inadequate”

People strongly disagreed – they thought that it has been very successful.

Definition – what does mechanistic mean in this context? Kelvin's billiard ball model? Complexity does not undermine a mechanistic model – it extends it. Co-operative interactions between sub-atomic particles are a result of wavelike character - they do not imply any immaterial features. Events in the macroscopic world remain causal and largely Newtonian.

The fluidity of the genome is a question mark. Most genomes remain stable and linear. There are mobile elements but if this was the norm there would be no genome to be determined. We have 46 chromosomes. Chimps and gorillas have 48. The telomeric fusion that reduced our set may be related to human kind but that was some 5 million years ago.

The key political issue is to prevent the human genome being used for commercial gain – as in patenting genes.



Quantum Entanglement

Quantum entanglement – as a consequence of the wave-like properties of small particles (even small molecules) is not related to the interdependence of ecosystems nor the need to develop creative partnerships.

All contributors who mentioned this paragraph took strong exception to making this link. They felt that it did not help make the case.

Political will

“Only the political will is missing”

Respondees objected to this statement, arguing that there is a need to think through how to deal with power and greed.

Some specific suggestions

- Hippocratic Oath – to abstain from research used in the pursuit of war or killing, maiming or other harm.
- GM moratorium on release of GMOs.

What is responsible science and technology? Suggestions were made for some main points:

1. Science should not be controlled by narrow vested interests
2. Science and technology should be precautionary
3. Science should be open to debate
4. Science should make use of a plurality of approaches
5. Technological development should be driven by the goals of social justice and environmental sustainability
6. Technology should not be used as a substitute for political and social action

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Why Should Biomedical Research Not Be Commercialised?

Mike Barnes argues the case for (appropriate) intellectual property law and commercialisation of research

The debate on the Convention On Knowledge has tended to discount the value of reductionist, western-style science, and in fact the draft Convention states that western-style science is being replaced by “holistic and ecological perspectives”. I believe this valuation is wrong: western-style science has in fact played a large part in the development of western society in terms of better health, education and standard of living. Furthermore, I believe that humankind will need to harness *all* knowledge systems, including Western-style science, if we are to develop a world with a good and sustainable standard of living for all people.

The draft Convention in my opinion makes many extreme and exaggerated statements about a variety of the topics it covers. However, I wish to focus on just one: this is that companies, apparently almost by their nature, are exploitative and negative in their effects on society. Without wishing to down play the undoubtedly exploitative behaviour of some large companies, or the ludicrous and wasteful extremes to which the consumer society is often prone, I believe that most companies, and the scientists who work in them, are carrying out activities which are fundamentally positive for society. They do this by making products, services and jobs available to the public.

Where companies exploit their economic strengths in ways detrimental to society, then these abuses should be dealt with by regulation through the normal democratic processes. The abuses are not a fundamental part of the way companies or society have to be organised. Incidentally this applies to the control which large companies appear to have over the globalisation process. It was not inevitable that (particularly) western governments work with large companies to extend economic globalisation. This approach was favoured, in fact seen as inevitable, by the neo-liberal political and economic philosophy associated with Reagan/Thatcher. If we are to

reverse it we have to develop a fairer, more just, more democratic and coherent political philosophy.

This paper will therefore cover the commercialisation of science in developed countries, especially biomedical science with which I am familiar: the reasons why commercialisation should be expected; why it is beneficial; examples of results; the commercialisation process; and the patent system, without which in the biomedical area at least, very little science would be commercialised. Note that >90% of bioscience research is in healthcare, not plant or agricultural science (my estimate).



There are major questions as to the negative effects of extending the patent system to countries with poorly developed research and development capabilities as the Trade Related Intellectual Property Rights Agreement (TRIPS) does. I do not have space to cover these issues here, but a recent review commissioned by the UK government Department of International Development highlights many areas where changes to TRIPS are desirable.

Why commercialise biomedical science?

Commercialisation is simply the usual route by which the results of research are made available in the form of new products, services and jobs. There are several reasons why there is

Biomedical Research: UK Public Sector/Charity Funding

Funder	Funding 2000/1 (£m)
Research Councils: MRC BBSRC	320 203
Charities: Wellcome Cancer Research	600 ~130
NHS	376
Total	1629

increasing pressure to commercialise biomedical research results.

- Biomedical research is heavily funded by the UK government and charities (see table above), and it is right and fair that the public should benefit from its results where appropriate. Indeed, I think the public *expects* to see results in the form of better drugs and treatments when it makes donations to research charities, for example in cancer.
- Western governments, including the UK one, increasingly see the “*knowledge economy*” as a desirable strategic goal. Unlike old economies based on heavy industry, knowledge economies are based on high technology, and hence commercialisation of UK publicly-funded research is seen as a generator of economic growth and high-tech jobs. The UK government consequently funds various programmes designed to facilitate transfer of research results to industry and hence to the market.
- It is also true in my experience that many biomedical research scientists are highly motivated towards the public good in their work, and are keen to see their work made use of for the public good.

Some results of commercialisation of biomedical science

When it is considered that molecular biology is not much more than 25 years old, the results in terms of new drugs and jobs are remarkable. For example:

- 130 biotech drugs/vaccines have been approved by the FDA in the USA.
- the European biotechnology industry has generated 23,000 jobs, mainly in health care.
- The UK pharmaceutical / biotechnology industry has 88,000 jobs directly, plus 250,000 in related industries.

What is commercialisation?

Commercialisation is simply the process by which an innovation is made available to the public. This has been facilitated by governments which have allowed universities to retain title to inventions made under research programmes funded by government agencies, for example, in the UK, by BBSRC.

There are two basic routes for commercialisation.

In the biosciences, neither process will take place unless the invention has been patented because large amounts of investment money are required to develop new diagnostics or medicines, and a limited monopoly position reduces the risk of investment to a manageable size.

Licensing

- A company agrees with the inventing institution to develop appropriate products/services based on the novel science.
- The company spends risk money on further R&D, manufacturing & marketing/sales.
- The company may sponsor research at the inventing institution to further develop the science.
- The company pays the inventing institution for the right to develop & exploit the invention (royalties).
- Part of this payment goes back to the inventing research group.
- There is no certainty that development and sales of the product or service will be successful. If they are not, the company will lose its investment.
- However, the development will hopefully be successful, and the company will hopefully make a

profit from its investment which it will use to continue its business.

Company start-up

- Alternatively, the inventing institution may start a new company to develop the science and products or services further. New companies again frequently fail, but those that are successful in developing new products or services often generate many new and high tech jobs.

How prevalent is commercialisation of university research?

- One of the UK's largest technology universities, the University of Manchester Institute of Science and Technology, has signed 75 licenses and set up 40 new companies over the last twelve years. I do not believe this can be called "rampant commercialisation" (draft Convention).

The patent system

The patent system is an integral part of the commercialisation of science in the developed world. Patents are limited monopolies and are intended to stimulate innovation for the good of society. Few biomedical science innovations would reach the market without them. The system is complex and constantly kept under review so that it can deal adequately with new technologies and developments. I summarise it below.

The need for, or fairness of, patents is frequently questioned. The best analogy is copyright over books, music, etc, which allows authors and composers to benefit financially from their creative work: I don't believe this is ever questioned, and the analogy with individuals or companies who create something novel and useful and apply for a patent on it is clear.

So what is a patent?

- An invention that is novel, not obvious & useful. Discoveries are not patentable.
- Has to be granted by one or more patent offices—not easy.

- Confers a monopoly on the use of the invention for 20 years from filing
- It is the right to use the invention that is owned ("IPR") not the invention itself (e.g. new drug, genes).
- The inventor has to publish a detailed description of the invention in return for the limited monopoly so that the invention is in the public domain.
- Certain inventions cannot be patented, e.g. software, "contrary to public morality", animals if suffering caused exceeds any likely human benefit

Difficulties with patent system

- In fast developing fields, what is novel rapidly becomes normal. Requirements need frequent updating
- What should be patented: genes, life forms?
- The system has dis-benefits when applied to developing countries who have little local R&D—TRIPS (see recent report of UK Commission on IP Rights)

Dr Mike Barnes worked in industry for many years and is now with Life Science Consultants.

Vested Interests in Science - an Update

Jonathon Goulding examines the influence of vested interests on the publication (or not) of scientific results

In March 2002 a letter was sent to 200 journals by the Centre for Science in the Public Interest (CSPI), a non-profit organisation based in Washington. The signatories to the letter included former editors of *NEJM* and *JAMA* (Van Kolschooten 2002).

The letter urged the journals to strengthen their policies on the disclosure of conflicts of interest – “whether the issue is clinical research, cancer clusters or global warming, **corporate interests can hide behind the credibility of peer-reviewed journals**”

Lisa Bero, a pharmacologist at the University of California, has no doubt that commercial interests are biasing scientific literature. “Studies that are sponsored by a single company are biased compared with studies with multiple or other sponsors... When **research is funded by one company** that has an interest in the outcome it is much more likely to have a **favourable outcome for the sponsor’s product.**”

In 1996 Richard Davidson reviewed 107 published clinical trials and found that those sponsored by drug firms were more likely to report favourably on the treatment being tested (Davidson 1986).

Another example looked at 70 articles dealing with the safety of calcium channel antagonists (used for treatment of cardiovascular disease). The authors of original research papers, reviews and letters to the editor were split into 3 groups: supportive of the drugs’ use, neutral and critical. For those who were supportive of the drugs, 96% had financial relationships with the drugs’ manufacturers; this was in comparison to the neutral group (60%) with financial relationships), and the critical group (37%).

Although many frontline journals have disclosure policies, many

journals do not. The reasons given include the increased paperwork this would entail, and also the fears that submitters would just go to another journal. Mildred Cho (a bioethicist at Stanford University) claimed that ‘there are journals where the financial ties of the editor determine what gets published...After publication those papers are used as marketing tools by the companies that produce the devices...But **we don’t know the prevalence of editorial staff having commercial ties**’ (Van Kolschooten 2002).

In Feb 2000, *NEJM* revealed that since January 1997, 19 of the 40 drug-therapy review articles it had published were written by scientists with industrial links that should have disqualified them under the journal’s strict publication policy (Angell et al. 2000).

In the 1990s a team led by Nancy Oliviera of the Hospital for Sick Children in Toronto, concluded that deferiprone (used to treat thalassaemia) did not adequately control the build up of iron in patients’ livers. Due to a clause in her contract with Apotex (the drug’s manufacturer) she had to wait three years before publication (Olivieri et al. 1998).

Another example of this was work done by Betty Dong. She showed that Synthroid (the leading drug used to treat people with underactive thyroid glands) was no more effective than cheaper alternatives. This finding was not published for seven years. During this time Boots Pharmaceuticals tried to enforce a clause in its contract with Betty Dong that gave the company a veto on publication. Dong eventually published her results in *JAMA* (Dong et al. 1997).

It is not known how many more papers have had their publication prevented by companies, or how many favourable papers are the work

of drug companies rather than the scientists named as authors.

Jeffrey Drazen (editor-in-chief of *NEJM*) is convinced the latter occurs, “they [the authors] don’t call you back themselves, but get the sponsor on the phone, who doesn’t want to tell you everything because of his competitive position. Usually we are forced to reject such a manuscript.” (Van Kolschooten 2002)

Richard Horton (editor of *The Lancet*) argues that taking the “right” course of action is not simply an abstract moral issue, “there are too many examples of drugs which have been licensed that had to be withdrawn because the supporting data were inadequate or because the company put too much positive spin on weak data.” (Van Kolschooten 2002)

Dr Jon Goulding is working on the ongoing SGR “Vested Interests in Science” project whose scope includes the human genome project, gene patenting, funding, publication of results and the field of genetically modified organisms. Any suggestions, articles or comments would be greatly appreciated.

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The Future of Science in Relation to the Patenting of Scientific Knowledge

Norman Sheppard suggests we to unify international patent law and restrict it to genuine inventions not basic science

In the past private companies have patented specific applications of published scientific knowledge. Increasingly today, with offers of finance, they are pressing to participate in the scientific research itself with a view to obtaining intellectual property' by taking out early and wide patents within commercially promising fields. This situation became particularly apparent, and led to widespread and unfavourable comment, during the elucidation of the structure of the human genome when the publicly financed project had to enter into an undesirable race with the private firm Celera so as to ensure that much of the information remained in the public domain. This type of situation is becoming widespread in the areas of emerging biotechnologies and of pharmaceuticals. It threatens the future of science at least in the highly successful form in which science has contributed so much to the welfare of mankind since the 17th Century.

Science has traditionally been the source of publicly available knowledge about the natural world. It derives its progress and its reliability, and therefore its standing with the public, from the encouragement of unfettered criticism and modification of its content from within the international scientific community. Within the UK and in many countries basic scientific knowledge has been

regarded as consisting of discoveries which should be available for use by all; only specific inventions based on such knowledge have been patentable. A problem has arisen over more liberal regulations within the USA where recent patents of a wider nature have been claimed and granted. Recently I expressed concern about this situation in Chem@Cam, a journal of the Cambridge University Department of Chemistry. In response a reply was received in the next issue from Mr. Guy Selby-Lowndes within which one paragraph is very relevant to these concerns. This reads as follows:-

'Although US patent law derives its origin from the Statute of Monopolies of 1623, following independence a number of changes occurred. Even today, the US Government is reluctant to sign treaties which require US patent law to conform with that of the rest of the world. At present there are a number of items, such as computer programs, genes and lifeforms, where patents can be obtained in the US but not elsewhere. The US Patent and Trademark Office is funded annually by Congress and is subject to political manipulation. The European Patent Office and the UK Patent Office are self-funding; the latter makes a very considerable profit. These two organisations are not beholden to politicians.'

I draw two conclusions from this statement. The first is that in the globalised world it is very important to agree a single international patent law. The lack of this has led to much ad hoc lobbying of non-US governments and the European Parliament for patent flexibility of the USA type. The second conclusion is that, in drawing up such an agreement, it is essential that the voice of the international scientific community should be very clearly heard concerning the undesirable consequences for the freedom of science of allowing patenting beyond the confines of inventions. Another way of looking at the problem is to conclude that it is very important that litigation, which inevitably follows patents, should remain excluded from basic science. If in today's world this requires a closer definition of what is meant by basic science then it is clear that scientific, as well as business and political bodies, should be vitally involved in the decision-taking. In this context it is extremely important that the International Scientific Unions and the National Academies of Science express to the relevant political authorities the urgency of such joint deliberations.

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The Human Genome: a Major Challenge for Trust, Equity and Governance in Health Care

Gilles de Wildt of MEDACT gives a clinician's perspective on human genome work and its implications

The discovery of the Human Genome is nearing completion. Developments in genomics may have substantial implications for individual patients and their doctors on the one hand and for national and international public health and equity on the other.

Individual patients and their doctors

The study of individual variations and their relationships with susceptibility to diseases, or responsiveness to particular pharmacotherapeutic interventions is only beginning, but may lead to an increasing number of tests which can predict, in part, people's health. Predictive values are unlikely to be highly accurate, due to the importance of social and physical

environmental factors, but might well form a sufficient basis for risk selection by insurers and employers. Genetic tests results have been asked for by insurers in the UK in the recent past, in spite of a voluntary agreement not to do so (Meek 2001).

In many high and middle income societies, including the UK, many people depend on *for profit* or *not-for*

profit insurance to obtain mortgage protection, or life or sickness insurance. Usually, insurance will not be offered unless clients agree to the release of medical information held by their doctors. This means that medical information, by and large, can no longer be seen as strictly confidential. With increasing knowledge about people's medical conditions and susceptibility, individuals and societies may find themselves in a dilemma. It might be beneficial for individuals to know their genetic predisposition with a view to planning their future and for the question of whether or not they want children, but the same knowledge may ruin their financial and social future and that of their dependants. It is conceivable that in the future, genetic scientists and insurers may develop risk tables for susceptibility to a large number of common and rare conditions for the offspring of parents with known genetic properties. If the prevalence of conditions is large enough risk selection may also occur by negative testing, with those who refuse to undergo a test paying a higher premium. This is a potential nightmare scenario, which will undermine confidentiality and trust in the doctor-patient relationship. The issues which arise need to be confronted through public debate, and strong national and international legislative frameworks based on the protection of confidentiality and human rights to health, equity and dignity (de Wildt 2001, UNESCO 1997 and 1999; UN CESCR 2000; PHA 2000).

Equity and public health

The huge costs of genomics research and development detract from more acute and more important health problems, including diseases of poverty such as TB and other conditions including HIV/AIDS and malaria which require massive investment in social and medical interventions.

It is not certain whether the genomic revolution will lead to a significant number of meaningful therapeutic and preventative interventions, including drugs and vaccines (Zimmern 2001).

Diagnostic tests and therapeutic agents based on genomics are likely to

be very expensive. This is worsened by the practice of allowing patenting of parts of the genome by private companies (e.g. in the USA), although the contributing research often sprung to a significant extent from public funds. Also, the consumer costs of pharmaceuticals are expected to rise significantly if current patent arrangements through the Trade Related Intellectual Property agreements (TRIPS) of the World Trade Organisation do not change. A further block to equity is that rich countries and companies bully and arm-twist poor countries to give up rights to obtain affordable pharmaceuticals (Bluestone 2001; Wilson 2000). The declaration of Doha, where WTO trade minister agreed that public health should have precedence over patenting rules, is undermined by the US (Oxfam 2002) and the European Commission (Love 2002)

Opportunities

A determined international approach is required to ensure that 1) investment in social and public health programmes to combat diseases of poverty will not suffer and that 2) beneficial applications of genomics will become available in an affordable manner to poor countries and poor populations. Patenting of parts of the human genome, and their variations, should be outlawed (EFMA-WHO 2000, 2001). The arrangements in the WTO and TRIPS relating to health, health care and patenting need to be renegotiated (Oxfam 2002b, Hilary 2001) to enable poor countries to easily obtain affordable pharmaceuticals through compulsory licensing or parallel imports and to be able to give priority to the right to health over private profits. Also, bullying and arm-twisting of countries by rich countries and blocks and pharmaceutical companies should be outlawed and credible sanctions should be put in place against it.

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Open Knowledge

Alan Cottey advocates an adaptation of Open Science

By the phrase Open Knowledge I mean a certain schema that defines a standard of openness of knowledge. The central element of the schema is a set of guidelines for those who would participate in the generation of OK. A sketch of the guidelines is given below. Knowledge claims conforming to the guidelines would be published on the World Wide Web. Such a publication must provide ready access to supporting evidence and arguments for its claims. Criticism and testing of the claims should be made as easy as possible. The OK proposal is an adaptation, to the broader field of knowledge-in-general, of the Open Science proposal, which I have described elsewhere, for example in SGR Newsletter 21, Autumn 2000, pp 8-9, and at <www.sgr.org.uk/SciencePolicy/OpenScience.html>

Criticism As Well As Dissemination

This meaning of Open Knowledge differs from a meaning that has recently become widely used. If one makes a web search on the phrase 'open knowledge' one gets many hits and they relate to free access to knowledge but are not directly concerned with the question 'when should knowledge claims be accepted as knowledge?'

Open Knowledge in this article means something more, for it is not enough

to have an excellent means of disseminating knowledge if audiences have inadequate means of critically judging what is made available. Instead of taking knowledge as a given, and just considering how it can be most widely disseminated, I focus first on the knowledge claim. Someone asserts or reports something. What structure can best aid critical judgement by audiences?

In science, criticism and testing of claims are fundamental. In the Open Science proposal, I make the case for some scientific projects to be done in a radically open manner - open from beginning (proposals to ethics committee and to funding body) to end (archiving of conclusions) - in conformity with an Open Science Protocol. Knowledge-in-general is produced in a much less formal way than is scientific knowledge. The project-oriented Open Science Protocol is too formal to be helpful in attempts to promote the Open Knowledge concept. Nevertheless, two central features of science, publication and criticism, are applicable also to the generation of knowledge. (Here, 'publication' is understood in a generalised sense, 'making public'.) Publication and criticism are the key to the transition from a knowledge claim (which can be as wacky as may be) to knowledge (which must be amenable to criticism and have gained a significant degree of public acceptance).

For establishing an appropriate standard of openness for knowledge-in-general, as opposed to scientific knowledge, guidelines, and not a protocol, are needed.

Sketch Of The Guidelines

I: Refutation

- the initial claim and all subsequent comments should be amenable to discussion. The main points made should be supported by an appropriate mixture of argumentation, evidence and references. There should be no avoidable obstacles to modification or refutation of the claim

II: Technical Means

- the initial claim should be launched in a formal way, that is, stated to be part of the Open Knowledge schema. The OK Guidelines would be published with the initial claim

- the initial claim should be widely accessible. This means that it should be published on the World Wide Web, using the simplest and most widely available IT standards adequate for the needed communications. These standards should be, as far as possible, compatible with older software and printer-friendly

- the web presentation of the initial claim should include an easy-to-use means whereby comments and additions can be added, so that the whole comprises a discussion thread

- subsequent contributions should, as far as possible, follow the formats of the initial claim, so that the resultant thread is easy to use

- the thread should be durable, an archiving process being part of the initial publication

III: Knowtiquette

- all contributions should aim to promote the production of critically tested knowledge. Robust criticism of the knowledge claim should be encouraged. Censure and disparagement should be avoided, as should personal comments (positive or negative)

IV: Democracy

- anyone presenting a knowledge claim conforming to sections I to III above should be treated by others as having presented a valid knowledge claim and be accorded a respectful but critical hearing

V: No Closure and No Gateway

- an OK thread has a beginning but no formally declared end. The aim of the contributions is to add to humanity's stock of reliable knowledge, while recognising the incomplete and provisional nature of all knowledge

- at no stage is a knowledge claim formally declared to have become



knowledge. Accepting a knowledge claim to be knowledge remains forever the prerogative of each individual. In practice, however, wide public consenses often do emerge.

The Role Of The Open Knowledge Schema

Knowledge-in-general is generated as part of the totality of human discourse. Threads conforming to the schema here proposed would constitute but a minute fraction of humanity's knowledge production. I suggest that this minute fraction would nevertheless influence knowledge as a whole, because it

would draw attention to the difference between knowledge claims and knowledge, and would clarify the nature of that difference.

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Would You Trust a Knowledge Bank?

Zoe Young highlights the World Bank's foray into the arena of knowledge

The late 1990s saw the World Bank appoint itself a 'knowledge bank', with its economists managing and disseminating information on behalf of the global 'development community'. Given the Bank is effectively a servant of western treasuries with technocratic, mostly Anglo-Saxon management unwilling to share details of their own work, this new agenda raises urgent issues of editorial control, complicated by linguistic and political bias. An effective civil society boycott of one key element of the 'knowledge bank', the multi-million dollar 'development gateway' web portal to 'quality' development knowledge, points to the scale of unease over the Bank buying control over ever more of our world.

The basis for this unease is illustrated by the following quote from the World Bank's 1998 World Development Report:

"KNOWLEDGE IS LIKE LIGHT. Weightless and intangible, it can easily travel the world, enlightening the lives of people everywhere. Yet billions of people still live in the darkness of poverty unnecessarily. Poor countries - and poor people - differ from rich ones not only because they have less capital but because they have less knowledge. Knowledge is often costly to create, that is why much of it is created in industrial countries"

In the real world, the Bank's ambition to enlighten the poor is not only philosophically ridiculous, but blindly condescending to people who know only too well the realities of unfair development. It is also quite

dangerous, if even slightly effective in convincing politically naive academics, journalists and students of the Bank's beneficent intentions.

The World Bank was set up by the US and UK, essentially to balance the global economy in their interests. Based in Washington DC and backed by government finance, the Bank makes over 20 billion dollars worth of loans a year to the world's poorer countries. Loans pay for projects in energy, transport, agriculture, dams, education etc. Many are damned for being over large and unaccountable, using foreign expertise and priorities and proving ineffective for the stated goals of helping the poor. Governments unable to repay the resulting debts seek new loans, and the Bank imposes conditions tighten social spending, promote exports etc. These sectoral reforms can be summed up in terms of the global privatisation policy agenda known as neo-liberalism; an agenda facing increasing cultural, social and environmental opposition worldwide.

As I found in my study of the Global Environment Facility, (see www.newgreenorder.info) the Bank is increasingly good at responding to its critics. In fact around half the Bank's professional staff work exclusively on policy and produce reams of glossy publications, like the World Development Report quoted above. Hundreds of thousands are sent free to journalists, libraries etc around the world who often cannot afford other information sources. Meanwhile, WDRs attract serious criticism from academics and activists who know

how they are produced, and what is left out.

The Bank has privileged access to vast quantities of data about almost every economy in the world. Yet it won't share this, publishing only its own interpretations. Leaks from Bank staff suggest that internal 'thought police' ensure only the accepted wisdom on liberalisation being good for poor is propagated, with the result that an academic, Ravi Kanbur, invited to edit the WDR in 2000 resigned rather than put his name to it. Soon after, the Bank's chief economist Joseph Stiglitz left his post in uncertain circumstances after publicly challenging the Bank's credo. He was then honoured with a Nobel prize for his work on the importance of limits on access to information in economics.

The Bank's knowledge management agenda continues apace. For example, it supports a Global Development Network and development thinktanks worldwide, and even an African Virtual University. This provides cyber courses from US establishments to the same African countries which are losing their own higher education systems to Bank supported budget cuts and privatisation of research.

As scientists, we need to be aware of the political and intellectual risks of this creeping power over the dynamics of knowledge for development worldwide.

Zoe Young is author of "A New Green Order" (Pluto, 2002)(see review on p21) and co-director of "Suits and Savages" (Conscious Cinema 2002)

Conference Reviews

Knowledge - Common Heritage, not Private Property

SGR discussion meeting held at University of London Union on 10 November 2002.

Around 35 participants attended this half-day event organised by SGR for the first UNESCO World Science Day for Peace and Development. The meeting aimed to explore current concerns about the widening of intellectual property rights and enclosure of the knowledge commons. In particular, the meeting addressed issues raised by the Convention on Knowledge (CoK) currently being developed by the Institute of Science in Society, the International Network of Engineers and Scientists, the Tebtebba Foundation (International Centre for Research, Education and Capacity Building for Indigenous Peoples), the Third World Network and SGR.

All of the speakers have articles elsewhere in this issue of the newsletter (page numbers appear after the speakers names below), and hence only brief summaries appear below.

Knowledge or Wisdom?

The first speaker, **Dr Nicholas Maxwell** (see p5 for full article), philosopher and author of "From Knowledge to Wisdom", asked "what kind of inquiry can best contribute to the public good"? He considered two rival conceptions of inquiry; "the philosophy of knowledge" and "the philosophy of wisdom". According to the former, acquisition of knowledge and technical know-how is a separate process from the application of such knowledge to social problems. Dr Maxwell argued that "knowledge inquiry" actually violates many of the basic aims of problem solving rationality. In order to promote human welfare the problems to be tackled are not problems of knowledge, but rather are problems of living or of action. The solution lies, he claimed, in "the philosophy of wisdom" whereby

priority is given to problems of living and the development of co-operative solutions, the basic aim of inquiry being wisdom rather than knowledge.

Another Science is Possible

Dr Mae Wan Ho (p1), Director of I-SIS and initiator of the CoK, gave an account of the genesis of the Convention on Knowledge, beginning with a chance conversation at the World Social Forum at Porto Alegre. Dr Ho discussed the wider motivation behind the Convention, and her own path from a "typical biologist" to activist. She laid out some of the main current threats including the privatisation of human genetic information and TRIPS (Trade Related Intellectual Property Rights). She made clear that the Convention was not intended to become a legally binding international agreement, but rather aimed at speaking for and to global civil society and demonstrating that "another science is possible", echoing the Porto Alegre call "another world is possible".

Dr Phil Webber (p10), Vice Chair of SGR, summarised feedback received by SGR on the CoK to date. There was, he reported, broad support for the idea of a Convention and in particular for addressing the problems arising from recent extensions to intellectual property rights. However, there was some criticism of the tone of the document, which was felt to ignore or downplay the benefits of science, and there were concerns over remarks that were felt to be unnecessary to the main argument and that could reduce the breadth of support. Some suggestions to simplify and clarify the arguments were proposed.

Commercialisation: Good or Bad?

Dr Mike Barnes (p12) of SGR argued the case for the commercialisation of (appropriate) intellectual property, speaking from personal experience within industry and as a consultant. He contended that commercialisation is the main way in which the fruits of research are made available, through products, services and jobs. In his view, patents are

intended to stimulate innovation for the good of society. However, he agreed that there were problems with the patent system, particularly with regard to the treatment of the developing world, but noted that there was some movement to address these concerns (e.g. the recent Report of the UK Commission on Intellectual Property Rights). Dr Barnes felt that much of what was in the Convention was unacceptable.

Political and Corporate Influence

Dr Jonathon Goulding (p14) of SGR reviewed cases from the ongoing "Science and Vested Interests" files being compiled by SGR, including corporate funding of science (e.g. the saga of the BAT-funded Centre for Corporate Social Responsibility at Nottingham), and conflicts of interest amongst government officials such as Lord Sainsbury.

Professor Norman Sheppard (p15) echoed earlier concerns about the recent extensions of patent rights, a change that challenges the notion that fundamental scientific knowledge consist of discoveries that should be available to all. Professor Sheppard noted that the US, but not European or UK, patent office is government-funded and subject to political manipulation. In subsequent discussion, it was pointed out that European and UK patent offices are heavily dependent on the fees charged to industry and so may well be influenced by the corporate agenda.

Dr Gilles de Wildt (p15) of MEDACT, discussed some of the dilemmas posed for doctor and patients by emerging genomic research, specifically the potential erosion of trust and misuse of information. More generally, Dr de Wildt discussed the iniquity of TRIPS which favours rich countries against developing and transition countries. He suggested one option might be to take health and education components out of TRIPS and GAT in the future.

Ongoing Discussion

Numerous contributions from the floor added significantly to the debate making this a genuinely interactive

meeting. Points and opinions emerging in the discussion included the following:

- whilst the Convention is laudable, we should recognise that younger scientists, in vulnerable positions, are not necessarily free to speak out and take strong ethical positions

- it can be justifiable to "work with the system", taking corporate money but using it for good.

- it is too simplistic to just say that "science should not be used in destructive ways", rather we should seek democratic control of science, for example through citizens panels

- intellectual property laws create a bias in the economy towards novelty and deliberate obsolescence

- patents push you into doing more and more patentable work; a case of the "tail wagging the dog"

- we need to be clear whether we are for a sustainable economy with limits placed on material wealth, or whether we agree with the idea of growth

Discussion of the Convention continues and further comment is welcome. Readers can view and comment on the Convention at <http://www.sgr.org.uk/SciencePolicy/ConvKnowledge.html>. Paper copies of the draft Convention are available from the SGR office on request.

Patrick Nicholson

Work and Welfare - Not Weapons

Conference organised by Greater Manchester and District Campaign for Nuclear Disarmament, Manchester Town Hall, November 2nd 2002.

This conference brought together a diverse range of speakers to discuss arms conversion in the UK.

Jeremy Corbyn MP introduced the day by highlighting the fact that the UK is the world's second largest arms exporter, exporting to many countries with questionable human rights records. This situation is justified, the Government claims, because of the importance of the arms industry to the UK economy and employment. The evidence, as the conference showed,

points in a rather different direction.

Tony Kempster of Campaign Against the Arms Trade (CAAT) provided some background concerning the UK's arms exports. Currently about 130 countries are arms customers of the UK, with over 50% of sales going to Developing Countries. The Government's export rules do place some restrictions on which countries can be customers, but this still allows arms to be sold to countries which have a record of human rights abuses. Further, even countries which are blacklisted can buy UK arms via third parties (a practice known as 'brokering').

Paul Dunne, an economist at the University of West England, gave a summary of the importance of the arms industry to the UK employment. Currently about 345,000 people are employed in the arms industry - which is only 1% of the UK's workforce. Further, only 90,000 of these jobs (0.3%) are dependent on arms exports. With unemployment at a 25 year low, Dunne argued, this is an ideal time to encourage investment into other areas. These arguments were echoed by Ian Goudie, a Defence analyst, and author of a new CAAT report on this issue*. He argued that the recent shrinkage of the UK arms industry has provided valuable experience in helping employees leaving the arms industry find jobs in other areas. Further, the retraining involved has often cost less than the estimated £8,500 annual subsidy given to every job which depends on arms exports.

The final speaker in the plenary session was Tim Webb, formerly of the MSF union, who argued that the real reason why the UK is reluctant to reduce its arms industry is because it fears this would undermine its status as a 'world power'.

The conference then broke into a series of workshops discussing the issues raised and what to do about them. One of the workshops focussed on ethical careers in science and technology and was run by SGR.

In conclusion, the conference pulled together valuable evidence that the UK could, without significant problems, pull out of the arms export business and reduce the size its arms industry generally. These arguments

are especially important at the current time, given the industry's attempts to capitalise on the 'war on terror'.

Stuart Parkinson

*CAAT (2002) The employment consequences of a ban on arms exports. <http://www.caat.org.uk/> ISBN 0 9506922 9 8

What Future for Arms Control?

Discussion Meeting organised by British Pugwash Group. Royal Society, London, Thursday 14th November 2002.

This very timely half-day discussion meeting brought together three senior commentators on arms issues, one each from the USA, Russia and the UK.

Dr Steven Miller from the Center for Science and International Affairs at Harvard University began the meeting by outlining current thinking among senior US politicians, both within the Bush Administration and wider. There is growing belief, Miller argued, that arms control agreements are not politically important. This is evidenced by the lack of agreements during the Clinton years, and the Bush policies of trying to dismantle treaties, e.g. Anti-Ballistic Missile (ABM) Treaty, Comprehensive Test Ban Treaty (CTBT), Biological Weapons Convention (BWC). This view is justified, US politicians believe, because multilateral arms control agreements are (a) simply an attempt to rein in US military power; and (b) too easy to ignore or cheat on. In response to this, the US is rushing to put together 'defences'. The most obvious example is 'missile defence' (described by one US commentator as 'a defence that won't work against missiles that don't exist!'). Others include developing more flexible nuclear 'deterrence' (e.g. low yield nuclear weapons for possible use on the battlefield); more reliable intelligence gathering; 'aggressive diplomacy'; and the 'preventative use of force'. These last two policies form the basis of the US strategy with regard to Iraq. The economic cost of these strategies, despite being huge, is considered money well spent, especially in the light of the

September 11th attacks.

General Sir Hugh Beach, formerly Master General of the Ordnance, began his talk by outlining some of the recent progress in disarmament. He highlighted the case of the Intermediate-range Nuclear Forces (INF) treaty which came into force in 1988, before the fall of the Soviet Union. This treaty was notable because: (a) it was the first to eliminate an entire class of nuclear missiles (those with ranges of 500km to 5500km); (b) it allowed on-site inspections of disarmament, which were successfully carried out; and (c) it achieved an actual reduction of weaponry at a time (still during the Cold War) when many experts said this was impossible. Beach then went on to briefly outline some other disarmament initiatives which are leading to positive outcomes:

- START I: a treaty on the reduction of the strategic nuclear arsenals of the US and former Soviet states, which has led to major cuts;
- Co-operative Threat Reduction programme, where the US has helped former Soviet states dismantle and make safe many of their nuclear weapons and related materials;
- the Conventional Forces in Europe (CFE) Treaty, which led to a massive reduction in the armed forces stationed in Europe;
- the Ottawa Convention, which has banned landmines.

Despite these positive steps, Beach acknowledged the negative influence of current US policy, especially its obstruction over the BWC and the

CTBT. However, contrary to many arms control commentators, Beach argued that some hope that could be derived from the planned missile defence system. Because there are discussions, not only about the system including Europe, but also Russia, Beach felt that this initiative could lead to a lessening of the military threat. However, he did acknowledge two particular concerns about missile defence: the alienation of China leading to possible nuclear arms race; and the deployment of weapons in space, with all the problems that might bring.

The final speaker was Dr Alexander Nikitin, Director of the Centre for Political and International Studies in Moscow. He focussed on the Russian experience and viewpoint on four areas of arms control: control of conventional forces; tactical (short-range) nuclear arms control; strategic (long-range) nuclear arms control between Russia and the USA; and multilateral arms control. In discussing conventional forces, Nikitin highlighted the important progress made in implementing the CFE treaty, as mentioned above. The key point concerning the control of tactical nuclear weapons was the fact that much of the roughly two-thirds reduction in arsenals that was achieved after the collapse of the Soviet Union, was through unilateral disarmament by both sides in the absence of a formal treaty. Further, the Russian satellite states, such as Belarus and Ukraine, agreed to become non-nuclear states during this disarmament. Nikitin then discussed the Strategic Offensive Reduction (SOR) Treaty recently agreed between the USA and Russia to reduce strategic nuclear weapons. He felt that

the treaty was to a large extent redundant since Russia cannot afford to maintain its strategic arsenal, and the USA wants to redirect its nuclear effort into 'bunker-busting' low-yield nuclear weapons - hence both countries will make large cuts anyway. Further he expressed the concern that the treaty has so many loopholes that it is unlikely to prevent either side from deviating from the intended path if either wishes. Nikitin highlighted that one obstacle to Russian arms reduction was the problem of finding alternative employment for military personnel in the current economic conditions! In summary, Nikitin said that Russia is now, in contrast to the USA, generally sympathetic to arms control, including unilateral arms reduction, except in conventional forces due to the ongoing war in Chechnya.

In conclusion, the discussion meeting was very informative on a wide range of arms control issues. Unsurprisingly, none of the speakers were hopeful about the prospects of serious arms control in the near-term due to the prevalent 'hawkish' attitudes which dominate in Washington. It was particularly depressing that the most positive prospect that any of the speakers could suggest was that there would be widespread co-operation on some limited form of missile defence system. This, I feel, would be a monumental waste of money, and quickly lead to the militarisation of space. Clearly the peace movement needs to make itself more widely heard!

Stuart Parkinson

Book Reviews

War Plan Iraq

Milan Rai (with a chapter by Noam Chomsky)

Verso, November 2002, 256pp, £10.
<www.versobooks.com>

Milan Rai is a writer and peace activist whose previous publications include "Chomsky's Politics (Verso

1995) and a number of solidly-researched pamphlets on peace and security issues that have been well-received by academics and activists alike.

War Plan Iraq was written in six weeks last Summer when it became clear that military action against Iraq was a real possibility. The book brings together the arguments that can help to prevent war. In particular,

Milan Rai demonstrates that, contrary to Mr Bush's assertions, inspection of Iraq's weapons is an option. Indeed inspection is the only option that can ensure real and lasting disarmament of Iraq. He uncovers Washington's role in the collapse of the first UN weapons inspection agency, UNSCOM, and the subsequent paralysis of UNMOVIC. Other topics covered are the control of Iraq's oil, leadership/regime change, and nuclear

weapons threats against Iraq. At the core of the book are “ten reasons why we shouldn’t launch another war against Iraq”, which make short work of dismantling much of the US and UK Governments’ pro-war propaganda.

The book includes a contribution entitled “Terror and Just Response” by Noam Chomsky, and powerful statements from relatives of the victims of 11 September 2001. Visually, the text is complemented by photographs of Iraq by Kim Weston-Arnold and by wood engravings and linocuts by Emily Johns.

British support remains crucial to any US-led war on Iraq, and majority of the British public are either ambivalent or opposed to the proposed war. This book is an invaluable factual and intellectual tool kit for all those working to stop this war.

Patrick Nicholson

A New Green Order? The World Bank and the Politics of the Global Environment Facility

Zoe Young.

Pluto Press, 2002, 292pp, £16.99.
<www.newgreenorder.info>
<www.plutobooks.com>

In this book, Zoe Young investigates the Global Environment Facility, a multi-billion dollar project set up in 1991 under the auspices of the World Bank to fund aspects of the international conventions on climate change and biodiversity. The GEF finances the ‘incremental costs’ of

achieving ‘global’ environmental benefits. Essentially this means paying for the extra costs of development projects that protect aspects of the global environment such as biodiversity, atmospheric ozone etc.

The book demonstrates how the GEF has allowed Western governments to deflect adverse publicity and protest whilst keeping control of the direction of “global conservation” initiatives. The GEF is crippled by its inability to challenge the economic policies and vested interests of the Western governments and corporations. In fact the GEF has spearheaded moves to put prices on nature and open up Southern resources to global experts and investors. As Zoe Young puts it “...for all the GEF’s surface democracy, participation and science, agreements reached in ‘economic’ Bretton Woods institutions still take precedence over environmental and social agreements reached in the UN.”

Zoe Young interviewed over 80 people in researching this book, including members of the GEF, the World Bank and the UN, and also members of communities affected by GEF projects in India. Young frequently draws on this interview material, and these personal voices enliven and illuminate the text.

Young seems to retain some hope for the GEF, stating that “...it is probably the most ambitious international environmental institution in the currently dominant world order, and it remains possible that it will turn out to be relatively effective, despite the contradictions and flawed compromises that it embodies.”

However, Zoe Young is clear that valuable lessons can and should be

learned from the GEF. Understanding the GEF and its failings is a necessary step forward towards a just and sustainable world, and with this book Zoe Young has given us the means to do just that.

Patrick Nicholson

Corporate Watch Newsletter

Newsletter 11/12 Dec/Jan 2002, 16 pp, £1. Corporate Watch, 16b Cherwell Street, Oxford OX4 1BG (tel. 01865 791391). Available online in pdf format from <www.corporatewatch.org.uk>

Corporate Watch is a radical research and publishing group that was set up in 1996 by anti-roads activists who wanted to find out more about the construction and road-building industry. Since then the project has expanded and widened considerably to become an important information resource on multinational corporations and their political supporters.

The bi-monthly newsletter, reviewed here, is packed with news of anti-corporate activism from around the world, and cutting-edge research into corporate misdeeds and cover-ups. This particular end-of-year double issue includes articles on “The Invisible Handout of the Market” (defence companies and government not quite getting the hang of free trade), and “War is Business, Business is War”, as well as news updates on the situation in Burma and the expansion of NATO.

Patrick Nicholson

Letters

Darwinism

Scientific research may well be biased by political pressures: SGR, potentially, could do much for humanity. Unfortunately, far too often, critics, including members of SGR, combine, in their spoken words and written words, bigotry with an

incomplete knowledge of the facts. Their words, however much they may convince the ignorant, do little to provide constructive answers to real problems.

Paul Carline (SGR Newsletter No 25) questions the validity of Darwin’s hypothesis and suggests it lacks an ethical element. An ethical approach is certainly appropriate when

proposing *applications* of scientific knowledge. On the other hand, when much scientific knowledge has a major potential for *both* good and evil uses, ethics should never be a component part of any assessment of the validity of the evidence underlying the truth of that knowledge. A scientific truth does not change its validity merely because it

agrees or conflicts with some arbitrary ethical concept. We should never forget that our vast and rapidly increasing scientific knowledge is still far from being the whole truth. We cannot know what we do not yet know. We should also beware of a common human failing; considering only evidence that supports preconceived beliefs.

Paul Carline, and many other critics of evolutionary (and other) concepts, typically offer neither evidence of, nor proof for, their proposals. Until they can produce a large quantity of supporting evidence, their comments, although considered, must be taken with a pinch of salt.

Critics, with whom I have corresponded, often at some length, have included university professors and members of Mensa. In every case their opinions, however well argued, have been found to include major

assumptions based on half truths. They have always overlooked one or more highly relevant pieces of evidence.

Darwin's writings make it clear that he was well aware that he did not have all the answers. All of the major gaps have now been filled. Critics, unless they can produce a validated alternative explanation for aspects not yet explained in every detail, should stop nit picking and use their talents more constructively.

R.G.Stilson, Tring, Herts.

Patents

It is vital when discussing patents not to throw out the baby with the bathwater.

The individual patenting of ideas, and all that this implies, is the only way of

securing intellectual property. This is important in the field of original design. Thirty years ago I left regular employment to become a Patentee. I have applied for, and secured three successive patents in the field of electronics for specific integrated circuitry, or 'chips'. I fitted the first electronic light failure monitoring system to vehicles. In order to achieve this I had to take risks. I could not be employed by a company or my designs would belong to them automatically. I had to secure licensees, pay Patent Agents etc. I therefore needed the protection offered by patenting. In the area of discovery of natural processes, for example in genetics and Biotechnology, patenting should have no place.

G.A. King, Leominster

Events

In the event of an attack on Iraq...

...Protest outside Downing Street, or in your own town at 6pm on the day bombing commences. Also on the following Saturday, outside Downing Street at 6 pm. Called by CND.

Tel: 020 76072302
Web: www.cnduk.org

...One Hour Protest: Stop the War Coalition is calling for an hour's protest at your workplace/place of study etc on the day following an attack on Iraq.

Web: www.stopwar.org.uk

Every Saturday

Vigil Calling for the Release of Mordechai Vanunu

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

Tel: 020 7378 9324
Email:

campaign@vanunu.freemove.co.uk

Website:
<http://www.vanunu.freemove.co.uk>

Every Monday

Anti-War Vigil

Opposite Downing Street, London, 6-7 pm. Organised by *Active Resistance to the Roots of War* (ARROW).

Tel. 020 7607 2302

11 February 2003

Gene Futures Conference

Conference organised by The Five Year Freeze, Elm Farm Research Centre, Genewatch UK, and Unilever, in association with the Guardian. At the Royal Society of Arts, London, 9.30-4.30. £15 individuals

Tel: 01298 872531
Email: mail@genewatch.org
Website: www.genewatch.org

15 February 2003

Don't Attack Iraq

Stop the War coalition demonstration in Central London

Tel: 020 70532155
Website: www.stopwar.org

22 March 2003

Science for the Common Good

Science, nature and environment activity day for National Science Week, 12-5pm, Tunbridge Wells Common, Kent. Organised by South East Alternative Science Network and others

Tel. 0845 458 9572
Email: PatrickN@sgr.org.uk

Website:
<http://geocities.com/seasonscience>

8-12 September 2003

The BA Festival of Science

University of Salford
Email: festival@the-ba.net

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

Join SGR - as a Member or an Associate

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Sgrforum

Keep in touch between newsletters - Subscribe to sgrforum

What is it?

Sgrforum is an e-mail list for communication between members of Scientists for Global Responsibility.

How does it work?

You can contact all the members on the list (currently around 100) directly, simply by addressing your message to <sgrforum@gn.apc.org>.

If you aren't already on the list, you'll first need to subscribe - visit the sgrforum information page at <<http://mailman.greenet.org.uk/mailman/listinfo/sgrforum>> and follow the (very straightforward!) instructions from there.

What's new?

If you prefer, you can now choose to receive sgrforum messages batched together in a daily digest, or (if you are going to be away, for example) you can disable delivery entirely. You can also view the previous messages to the list (by subject, date or sender) in the sgrforum archives. To select any of these options, visit the information page (as above).

Any other questions?

Contact the list administrator <KateM@sgr.org.uk>

Other email contact

SGR has a number of specialist email addresses <__@sgr.org.uk> to use to contact particular people within SGR or for particular issues. A full list can be found on our web-site: <<http://www.sgr.org.uk/>>

Letters

Letters for inclusion in the Newsletter should be sent either by email to <newsletter@sgr.org.uk> or by conventional mail to 'The Newsletter Editor' at the SGR address (see left). Letters may be edited in the interests of clarity or brevity.

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

The theme of the next newsletter will be "War and Terror" and the provisional copy deadline is 1/5/03. Articles and letters from both members and non-members will be considered. Please send contributions to <newsletter@sgr.org.uk> or the postal address for SGR: see left.