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The Science Wars

Volume 3

Suppressing Dissent

**Mae-Wan Ho
& Others**

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Pusztai Publishes Amidst Fresh Storm of Attack The Sorry State of 'Sound Science'

Pusztai has published amidst a fresh storm of attack, and even reported threats to the Editor of The Lancet (see Ewen, S. and Pusztai, A. (1999). Effect of diets containing genetically modified potatoes expressing Galanthus nivalis lectin on rat small intestine. The Lancet 354, 1353-4; also <http://plab.ku.dk/tcbh/PusztaiPusztai.htm> for Pusztai's full rebuttal to his critics). The controversy reveals the sorry state of the so-called 'sound science' which his critics purports to defend, and highlights the general disregard for the precautionary principle in current 'risk assessment'.

GM potatoes expressing a snowdrop lectin (GNA) under the cauliflower mosaic viral (CaMV) 35S promoter have been developed to increase insect and nematode resistance. GNA was chosen because previous studies by the authors showed the effects of the lectin on the rat small bowel have been 'minimal', at least when fed on large amounts of the lectin for ten days or less. Pusztai's collaborator, Stanley Ewen, examined the microscopic structure of the lining of different parts of the rat gut in groups of animals fed for ten days, respectively, on non-GM potatoes, GM-potatoes and non-GM potatoes spiked with the GNA protein. All the diets had the same protein and energy content.

Variable effects were found in different parts of the gut. In the stomach, a highly significant proliferation of the lining was found in both rats fed GM potatoes and those fed non-GM potatoes spiked with lectin. It was reasonable to conclude, therefore, that the effect on the stomach lining was mainly due to the expression of the GNA transgene. However, significant changes in the lining of the small intestine and parts of the large intestine were found only in the group of rats fed GM potatoes. Ewen and Pusztai conclude that "other parts of the construct or the genetic transformation (or both) could also have contributed to the overall biological effects of the GNA-GM potatoes." In addition, rats fed GM potatoes also had significantly increased lymphocytes (white blood cells) in the gut lining, which indicates damage to the intestine.

The explosive claim is that "other parts of the construct or the genetic transformation process" may be toxic. If that were the case, *all* GM crops may not be safe. Elsewhere, Pusztai has questioned the safety of the cauliflower mosaic viral promoter in the transgenic potatoes which is in practically all current GM crops. Could the signs of damage to the intestine be due to viral infection? That was a claim made in Pusztai's earlier communications, though not in the present publication. If so, might the cauliflower mosaic viral promoter have anything to do with it? (see Viral Gene Switch – A Recipe for Disaster? This issue)

Neither Pusztai nor Ewen regards their research as definitive proof that GM potatoes, or GM food in general is *harmful*. Pusztai has repeatedly stressed the need for further research. However, the results do throw into serious doubt the claim of the biotech industry and regulatory authorities that GM food is *safe*. *According to a leading British statistician, one should be worried about safety if even a single rat had been affected.*

The attacks on Pusztai say more about the sorry state of the so-called 'sound science' that lies behind current risk assessment, whether it be for radioactive discharge, industrial chemicals, toxic wastes or GMO. It is a reductionist, mechanistic science that ignores the complexity and interdependence of living systems, that has, furthermore, been thoroughly discredited by recent scientific findings (see *Genetic Engineering Dream or Nightmare?* Featured in Book Briefs, this issue). More importantly, it is directly in conflict with the precautionary principle that has been accepted in several international conventions including the Convention of Biological Diversity and the EU (see an excellent recent publication, *Protecting Public Health & the Environment*, featured in Book Briefs, this issue).

As applied to GMOs, the principle may be stated as follows: where there is scientific evidence to suspect serious irreversible harm, lack of scientific certainty or consensus should not be used as justification for not taking preventative measures. This is based on that offered in another important recent publication, *An Orphan in Science: Environment Risks of Genetic Engineered Vaccines*, (see Book Briefs, this issue), and in line with that adopted by Swedish law for hazardous and chemical products.

Risk assessment based on what Pusztai's critics refer to as 'sound science' not only ignores the complexity and interdependence of real living systems and reasonable suspicion of harm based on scientific evidence, it also places the onus on regulators and civil society to demonstrate that something is definitely harmful before it can be refused approval, withdrawn or banned. It is such systematic misuse and abuse of scientific evidence that has continued to allow corporations to endanger human health, destroy wild-life and our planet with impunity. No wonder there is a debate on whether risk assessment should be 'science-based' at all.

We believe that risk-assessment should be science-based, but it should be based on real, reliable science whose goal is to enable us to live sustainably with nature. In contrast to his critics, Pusztai has behaved with integrity and social responsibility as a scientist, which is fully in accordance with the precautionary principle. MWH

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“Trust me, I’m an expert” The Royal Society’s “Guidance for editors”

The Royal Society, more or less by definition the scientific establishment in the UK, has recently issued a set of recommendations entitled, “Guidance for editors”, which is reproduced with strong approval in the House of Lords Select Committee on Science and Technology Report on Science and Society (see How to Engineer Society to Accept Science as Usual, below). They obviously intend the document to be taken very seriously, because they begin by quoting the Press Complaints Commission Code that, “newspapers and periodicals must take care not to publish inaccurate, misleading or distorted material”, and warns that “Editors must be able to demonstrate that the necessary steps have been taken”. This is clearly meant as more than merely some helpful suggestions.

Everyone is in favour of accurate, genuine science reporting. We would not like to see so-called creation science treated seriously in the press, for example. There are, however, some very worrying aspects about this document. It ignores some of the basic principles of scientific enquiry and practice, not to mention the freedom of the press.

“Journalists”, we are told, “must make every effort to establish the credibility of scientists and their work”. Yes, but how is this to be done? The Royal Society will publish a directory that provides a list of scientists for the purpose. Before interviewing a scientist, the journalist will be expected to have consulted the officially nominated expert in the field, who will be able to say whether the scientist in question holds correct views.

Balance can be a problem for journalists: in politics it may be proper to give equal time to Government and Opposition, but things aren't so simple in science. Someone making a programme on smoking is not obliged to devote half the time to those few scientists who still insist that it is not harmful. The Royal Society, however, goes much further. “Newspapers may suppose that they have produced ‘balanced’ reports by quoting opposing views..” Not so, if “the opposing view is held by only a quixotic minority.” Journalists are told to identify, wherever possible, a majority view, and that is the one they should present. The majority view may turn out to be wrong, but such instances, we are told, are the exceptions rather than the rule. Perhaps they are, but the BSE crisis shows what can happen when those in authority are able to prevent a minority view being heard.

The Royal Society acknowledges that it is important for scientists to communicate via the media, but is concerned that some scientists may be seeking publicity to further their careers or to make exaggerated claims. To counter this, the media should contact “scientific advisers” (again, presumably supplied by the Royal Society) who could establish the authenticity of any story.

On the matter of “uncertainty”, “journalists should be wary of regarding uncertainty about a scientific issue as an indication that all views, no matter how unorthodox, have the same legitimacy.” The Royal Society insists that it is peer review that confers legitimacy on scientific claims. Up to a point, we agree, though even they admit that the process is not infallible. Hans Krebs' paper on the cycle that bears his name is not the only important one to have failed peer review.

There are other important caveats. First, many new scientific results are presented at conferences before they have been subjected to peer review. No one expects scientific journalists to wait until they are accepted for publication, which may be months later. Peer review is not and never has been a precondition for being brought to the attention of the public.

Second, where there is the possibility of danger to health or to the environment, it can be totally counter to the public interest to wait for peer review. If Dr Arpad Pusztai's work did not have possible implications for health, he would not have spoken of it before peer-review and publication, for which he was condemned by the Royal Society. Holding back on a scientific claim until everything is settled is one thing; not alerting the public soon enough to a possible danger is another. Of course, if Pusztai's data had not had potentially serious implications, it is doubtful whether the Royal Society or anyone else would have reacted as they did, which is in itself a point that should worry us.

Finally, it is not only via the press that scientific claims can directly affect the public. The scientific data submitted by commercial companies to gain regulatory approval for their products are seldom properly peer-reviewed or published, either in scientific journals or in the press. The

secret memoranda of the US Food and Drug Administration which came to light as the result of the Biointegrity civil lawsuit against the agency are a case in point (<www.biointegrity.org>). The first transgenic tomato to be commercialized actually did not pass the scientific peer-review, but these papers were concealed from the public by the FDA administration. The Royal Society, so quick to act in the case of Dr Pusztai, has said nothing about this side of the issue.

Surely, journalists as well as the public can be credited with critical judgement when the science is clearly explained. Part of our social responsibility, as scientists, is to promote genuine, critical public understanding of science and to encourage open debate in terms that the public can understand. It is the role of journalists to help scientists communicate real science to the public, not merely the views of one body of scientists.

MWH

How to Engineer Society to Accept Science as Usual

House of Lords Report on Science and Society

Some years ago, I listened to three popular science lectures at a seminar organized by Copus, the Committee on the Public Understanding of Science, formed in 1986 in the UK by the Royal Society, the Royal Institution and the British Association for the Advancement of Science. At the end, the lectures were judged. The one that was most praised was on a familiar topic, and while it did convey some real information, it was clear that the chief criterion was that it was the most entertaining. A second, well presented and providing an accessible introduction to an important topic, was much less highly rated. The public understanding of science had clearly come second to science as entertainment.

That incident symbolises for me the problems with the relationship between science and society, which a House of Lords Select Committee addresses in a new Report (Science and Society, Select Committee on Science and Technology 3rd Report, Session 1999-2000, House of Lords, The Stationery Office, London). This is the result of an extensive consultation exercise. Many non-government organizations including ISIS made submissions; and ISIS was cited explicitly twice.

The Report begins, appropriately enough, by noticing that there is a crisis of public confidence in science, brought on by what it referred to as the "BSE fiasco". In poll after poll, scientists, especially those working for the government and industry are among the least trusted. It also notices that instruments like Copus need more dialogue with the public, rather than just a one-way information to the public. In fact, the Report recommends extensive dialogues with the public, not just for the Government's own Office of Science and Technology (OST) and Copus, but as part of the brief of every research organization and learned institution. However, it gives no indication as to how public aspirations are to feed into science or policy decisions, or have any influence on them. On the contrary, it explicitly states, "To prohibit science from progressing without express public support in advance would be retrograde and repressive, and would stifle creative scientific research or drive it overseas." No, that is not what the Select Committee is recommending. Instead, dialogues with the public are "intended to secure science's "licence to practice", not to restrict it". Translated into ordinary language, "dialogue" is really a public-relations exercise, in order to allow scientists to do whatever they want to do in the first place. So, astonishing as it may seem, there is no mention of science and social responsibility, nor ethics or the public good, as one would expect in a report on science and society.

In the Chapter on communicating uncertainty and risk, it commends the guidelines for scientific advice issued by the Office of Science and Technology (OST), the main theme of which is "openness". So, where scientific advice is uncertain, this should be admitted from the start. But does uncertainty have any real impact on policies? No. The precautionary principle is not mentioned even once.

Strangely enough, in the same chapter on communicating uncertainty and risk, they admit that while scientific input to policy traditionally relies on "independent experts", "the concept of independence has become problematic, particularly because of the increasing commercialisation of research". So, what is the solution for the lack of independence in science? Scientists, they say, "must robustly protect and vindicate their independence", which is more easily said than done. "Sponsorships and affiliations must be openly declared, and must not be assumed to colour the quality or outcome of the science provided that the research output is submitted to peer review and published in the academic literature".

Again, that is more pious hope than a real solution. Declaring interests does not automatically guarantee lack of conflict of interests when scientific advice is given, and scientific data submitted by commercial companies for product approval are almost never published in the academic literature. The Report has to admit the difficulties, and calls for a "radically different approach to

the process of policy-making in areas involving science". What exactly does that amount to? That the Government should press for something like the OST guidelines to be adopted at EU Commission level, and that the Interdepartmental Liaison Group on Risk Assessment should look into current research on how risk information is received by the public. In other words, yet another exercise on how best to window-dress for the public.

That is not all. There is another more worrying agenda. The chapter on Science and the Media urges the Press Complaints Commission (PCC), in bold print and in the strongest terms, to adopt the Royal Society Guidelines: "We recommend these guidelines, and we urge the PCC to adopt and promulgate them. In doing so, the PCC should make it clear that they are aimed not just at specialist science correspondents, but at all journalists who find themselves dealing with science, including those on the news desk."

The Royal Society Guidelines effectively stifle dissent within the scientific community and promulgate the views of the establishment (see "Trust me, I'm an expert", above). For good measure, the House of Lords Select Committee adds several comments, the first aimed at discouraging sensational headlines such as those that might damage the image of GM crops; the second, incredible as it may seem, attempts to purge the word, "safe" from the vocabulary of the media. "The very question "Is it safe?" is itself irresponsible, since it conveys the misleading impression that absolute safety is achievable." This frontal attack on the English language is actually a veiled attempt to undermine the precautionary principle in its most important form, which can truly safeguard human health and the environment. It entails a reversal of the present onus of proof. In other words, instead of requiring civil society to prove something harmful before it can be withdrawn or banned, perpetrators have to prove something is safe before it can be approved, especially where the product is of no proven benefit to society.

The admission of uncertainty in science is an important step. The role of science is to set precaution based on uncertain evidence: the precautionary principle is part and parcel of sound science. It is time the scientific establishment put an end to the abuse and misuse of scientific evidence that has allowed corporations to endanger human health and the environment with impunity for the past fifty years.

MWH

Berkeley Professors Dare to Dissent

First critical forum on genetic engineering in any university on both sides of the Atlantic

Prof. Miguel A. Altieri of Berkeley and Dr. Peter Rosset of the non-Government organization, Food First Institute, both well-known proponents of sustainable agriculture, organized an International Workshop (March 2-4) on Ecological Impacts of Transgenic Crops in the University of California, Berkeley. Many of the participants also spoke to packed audiences in a campus-wide seminar and an open forum for the public. These events were the first ever on both sides of the Atlantic to have been organized by faculty members. All the more significant as the entire Bioscience Department of UC Berkeley has effectively been sold off to Novartis two years ago for US\$50 million, amidst strong protest from some of the academic staff and students.

The participants included scientists whose work has cast doubt on the safety of transgenic crops. The organizers are producing a report and have promised to make available the detailed proceedings and papers circulated.

Miguel Altieri emphasized the many forms of sustainable agricultural practices which have already led to 100 to 200% increases in yield in developing countries. David Andow questioned the efficacy of Bt-resistance management. Ann Clark urged the need for a process-based regulation rather than a product-based regulation on grounds that the hazards are inherent to the technology. Katherine Donegan spoke on the substantial impacts of transgenic crops and crop-remains on soil ecosystem which may drastically decrease soil fertility. Michael Hansen exposed the inadequacy of regulation and risk assessment in the US. David Hathaway spoke on the ecological implications for developing countries. Angelika Hilbeck summarized the research of her group on the effects of bt-transgenic corn and bt-toxins on natural enemies of target and non-target pests. Mae-Wan Ho and Allison Powell spoke on the ecological impacts of viral resistant transgenic crops, highlighting recombination between viral transgenes and other viral genomes to generate new viruses. Jane Rissler and Allison Snow updated the spread of herbicide tolerance traits from transgenic crops to wild relatives. There was a large measure of agreement among the participants that the risks are real, but opinions differed as to the appropriate course of action, which varied from calling for a total ban to a demand for labelling.

Speakers repeated their messages at the public meetings. Some students were giving out Novartis propaganda and a letter supporting agricultural biotechnology signed by 1000 scientists.

Apart from that, the critics of agbiotech were not challenged by the practitioners, many of whom were in the audience. These were milestone events, and congratulations to UC Berkeley for hosting them.

MWH

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OECD Agenda: “There is no evidence that GM-food is harmful”

Pusztai on OECD Meeting on GMOs Feb. 29 – March 2, 2000

Dr. Arpad Pusztai was the only scientist sceptical of GM food safety to be invited to the much publicized OECD’s intergovernmental Conference on GMOs. Here is his personal account, slightly edited.

After the meeting was opened by a number of politicians, Prof. Charles Arntzen from the Boyce Institute, USA, kicked off with the virtues of edible vaccines in potatoes. He made no comment on whether they would be tested rigorously; nor on the fact that they have to be eaten raw as heating would destroy the vaccine. Next, Dr Suman Sahai from Gene Campaign, India, argued convincingly that GMOs offer no benefit for developing countries. Instead, it was a means of exploitation, of robbing the poor to enrich the rich in the First World. Then came the darling of the Conference, Professor Zhangliang Chen (Vice President of Beijing University, China) who said China is slowly replacing everything with GM-counterparts and they have also tested their health effects on rats. However, no details on design or methodology or publications in peer-reviewed journals were given. This did not stop him from giving a glowing certificate of health and worth to all the GM-crops he tested. I was attacked for publishing our results in worthless rags such as *The Lancet* and *The Journal of Nutrition* when we should have done like Professor Chen and not published anything at all. I have a feeling that I was expected to ask for the forgiveness of the new God of GM-biotechnology.

After coffee came Professor Gordon Conway (President of Rockefeller Foundation) who gave his totally ‘unbiased’ views on the benefits, risks and ownership of GM-crop biotechnology. The ‘balance’ was redressed by the panellist who had 5 min each: both Benedikt Haerlin (Greenpeace International) and Mrs Marilena Lazzarini from the Institute for Consumer Defence, Brazil spoke well but made no great stir in the GM-biotechnology-dominated audience. In contrast a Novartis employee, Dr Andreas Seiter, did go through the biotech industry routine and was acclaimed by the audience.

The afternoon session on GM Food and Human Health should have been very short, as we have no data on this topic at all but that did not deter the Organisers. The first speaker, Prof. Ambroise Martin (University Lyon) had 20 min but did not say much. The next speaker was in Geriatric Medicine at Cornell University. He talked a lot about medical aspects of the old and at the end he waxed eloquently about the work of Arntzen who is a genius and is going to solve all the problems of the old by making them eat potatoes, bananas, etc with edible vaccines in them. The last speaker of the session before coffee was Prof. Hans Gunter (Darmstadt Technical University) who gave all the possible health risks of GM-food. There is obviously a subtle change in the air on GM-food in Germany – he sounded a warning note of caution. He advocated post-market monitoring of the effects of GM-food although he did not specify how to do this.

After coffee there was a presentation on Food Allergy and GMOs by Prof. Carsten Bindslev-Jensen (Denmark) who said that they tested all GM-food they could lay their hands on for allergy (skin-prick test with human subjects) and found that none of them was any worse than the non-GM counterparts. My problem with this is that I do not believe in these tests for a start so I am not so sure whether his message was a good one or not or just simply means that he used a technique, which is severely limited and found no problem.

Then came the panel discussion. As a special favour granted by Sir John Krebs, I was given 10 min to give my slides on my protocol (now on my homepage) which was cut to 8 min by the Chairman. It would not have made much difference if I had been given 1 h, the effect would have been the same. Nobody made the slightest reference to it then or later. As Prof. Chen from China had such a “poor” opportunity previously to give his views he was allowed another bite of the same cherry. The message was still the same and the audience loved it. Prof. Alan McHughen (University of Saskatchewan), another GM enthusiast, said that we must introduce all his GM-crops but must also be vigilant. He could not say how, in 5 mins. Finally, Dr James Maryanski of FDA told us of all the great safety tests the FDA had done and also how generously they were with public hearings, and made 44,000 pages of their files available to the public. Of course, this is not really needed because GM-food is the best and most rigorously tested food in the history of mankind.

He was refuted by US Lawyer Steven Druker from the Alliance of BioIntegrity. The FDA had not revealed those 44,000 pages out of the goodness of their hearts -they were made to do so by a Court Action. The files revealed how the FDA had completely ignored the advise of their own scientists about safety, especially, that there was no substantial equivalence between GM and nonGM crops. You can find Steven's contribution on the bioIntegrity website <www.bioIntegrity.org>.

I would like to say something about the personal attacks on me from the floor. I had some exchanges with Phil Dale from the John Innes Centre in Norwich. He said (remember that we ought to have discussed my slides!) that I am a particularly unfair person because I never discussed the results of our nutritional work with the SCRI and Durham scientists, although they were involved in the research. Actually, as I have coordinated the whole programme, I made sure that we had 3-6 monthly workshops with written minutes of the events. The next bits of exchange was with Monsanto and other biotech people who got upset about my remark that when we started in 1995 there was not a single paper published in peer-reviewed journals on the nutritional/physiological testing of any GM-food. They kept jumping up, one after another. to say that there were lots of papers; the Monsanto guy, Fox, said that he himself must have produced them by the dozen. I kept challenging them as to where these were published but they were not forthcoming in their replies. Eventually a number of people like Joan Ruddock tried to defend me from the floor. In fact, she later confronted the Monsanto guy in private when, as always, he admits that they must have misunderstood me. The truth is that they count anything, even their memos, as publications. It is no wonder that the Chinese scientists' talk went down so well with them.

On Tuesday the GM- propaganda machine got into a higher gear. Kuiper chaired the sessions throughout the whole day. Needless to say, he never allowed me to take part in the discussions. The first speaker was Prof. Bernard Chevassu-au-Louis (President of the French Health and Food safety Agency). He gave his lecture in French which even with the translation was a little difficult to follow. Generally, he did seem to be good. His most memorable contribution was that, on the basis of substantial equivalence one could not differentiate a mad cow with BSE from a healthy one, that has put the substantial equivalence principle in the proper context, no matter how much Dr Peter Kearns (OECD) tried to salvage it. He said we must use it as our guiding principle. This just showed up that these people do not understand (or do not want to) that science is quantitative. It is not much use to say that you are a little mad; one needs to know how little?

Dr Calestous Juma (Director, Science Technology, Development Programme, Harvard University) could not come, so we had a real treat, a Professor of Microbiology, who doubles up as the S. African regulatory authority stepped into his shoes. She was enthusing all the time and according to her, the greatest triumph of the GM technology is that one S. African woman farmer, by planting GM-cotton took 30,000 rands (£3,000) to the bank at the end of the season. We were all duly impressed and many biotechnologists during the rest of the meeting referred to her example. Unfortunately, even this was not documented but the believer of the new faith swallowed it nevertheless. Next was Dr Alan Randell (Codex Alimentarius, FAO) who gave a very good factual account of the work of the Codex people. Obviously, he was in favour of GM but he also recognised that we need to do our homework and carry out proper testing according to strictly agreed protocols. We shall see!

After coffee unquestionably the best talk of the session was given by Prof. John Durant (Head of Science Communication, Science Museum UK). He explained to all the blockheads of the GM-biotech industry representatives that it was no use to blame the GM fiasco on the press, on maverick scientists (I expect the likes of me), the gullibility of consumers, sinister green pressure groups, etc. The fault lies with the proponents. So from there on, the motto of the Conference was borrowed from him: "openness, transparency and inclusiveness". In the best example of hypocrisy, the Conference went on and referred constantly back to him The Consumer Perspective was then given very lucidly and forcibly by Mr Julian Edwards, which was good and to be expected.

The following panel and plenary discussion was quite something. I have never heard such extreme and sometimes disgraceful views expounded in public as was done by Dr Val Giddings (Vice-President for Food, Agriculture, Biotechnology Industry Organisation (BIO) US). To give you some of the flavour of what he said - the only way to solve allergenicity, once for all, was via GM-technology. It was pointed out that we only escaped by the skin of our teeth the brazil nut allergen transfer into soya. But he then used this as an example of how well the regulation worked. He went on - when he was in Brazil he was told by some of the politicians there that even if there were some deaths due to anaphylaxis it is a price well worth paying if they could at the same time feed

the population with this GM-soya. To show up how impartial the Chair was, nobody had a chance to reply to this once the people regained their breath after Dr Giddings great intervention. Mr Martin van Zwannenberg (ex-Divisional Director of Food Technology, Marks & Spencer, UK) had the distinction to almost physically attack me for my views, which disgraced science, etc...

Just imagine what sort of crowd they assembled here in Edinburgh? Clearly the creme of the society and 'science'.. Dr Michael Hansen (Consumers Union, USA) pointed out that (what I said above) science is quantitative and the present woolly definition of substantial equivalence is only a cop-out for the biotech regulators because how small is small. In fact the best would be to totally abandon this stupid thing. Needless to say, 90% of the people at the Conference would not agree with him. There was one very gung-ho GM person, who was absolutely impervious to any argument that was to her dislike. She was flatly opposed even to the idea of labelling. So much so that her views got into the final draft rapporteurs' report as something we "all agreed about". In fact, she was probably the only one who totally opposed the idea of labelling and nobody else made a great deal of it, even those from the GM-biotech industry kept reasonably quiet.

Sir John Krebs chaired the Wednesday session and this was somewhat of an eye-opener for me. The only speaker of the morning was Dr Ismail Serageldin (Vice-President, World Bank). He referred a lot to the South African farmer woman with her GM-cotton. Professor Chen from Zimbabwe also extolled the virtues of GM for the developing world and so on. Unfortunately, the Organisers forgot to invite people such as Tewelde Egziabher and others to counterbalance this open enthusing on the great value of the GM-technology. Obviously, the World Bank will be giving big loans to the poor Third World Countries to buy the technology or even more the seeds in order to increase their dependency on the First World multinational companies and increase their financial debt. After this Dr Peter Tindemans (The Netherlands) and Dr Ian Gillespie (UK) - the rapporteurs, introduced their draft report which was then discussed by the participants under the Chairmanship of Sir John Krebs. Half of this was taken up by personal attacks on myself and other sceptics. I must say that this was too much even for people like Kuiper, Tom Sanders and some other scientists and the remainder of the Consumer, green groups (most of them left by this time).

Needless to say, I was not given any chance to defend myself. But this is in the great British tradition. After all, I was gagged for seven months before so what's the difference now? I am not going to say anything about the draft report because it is supposed to be confidential. However, I have already made my protest about some of the points in the report. The most blatant of which stated that there was general agreement on the point that there is no evidence at all to show that GM-food has a harmful effect on health. I believe this was the main purpose of the Conference: to state this clearly so that the Government's hands will be untied, and they can go ahead to legalise the whole GM-business. I gave them a very strongly worded protest on this point because even if they disregard all of my work, how can they make such a sweeping statement when there has never been any experiments with humans to show whether GM-food is good, bad or indifferent. When the final report of Sir John is published, it will give me the opportunity to put my comments on my homepage. I know that it is regularly visited by people from all over the world and if there are many like me, then they will not be able to get away with this.

Science behind Closed Doors

Corporate science engineering 'consensus'

At the World Economic Forum in Davos early this year, Bruce Alberts, President of the US National Academy of Sciences (NAS), gathered behind the scenes with a group of a dozen other presidents of national science academies to create an International Academy Council (IAC) to provide "impartial scientific advice" to governments and international organizations on issues such as genetic engineering, threatened ecosystems, and biodiversity.

Bruce Alberts also chairs The National Research Council (NRC), which has a full-time staff of 1000 and a \$200 million annual budget. Through the NRC, the NAS conducts studies and prepares about 200 reports annually, largely under contract to federal agencies. In flagrant violation of the rules of open government - the 1972 Federal Advisory Committee Act - which Alberts still vehemently opposes, NRC committees and panels meet secretly in closed sessions. They do not disclose their minutes or conflict of interest statements, and fail to require that their membership reflects balanced representation of divergent interests and viewpoints.

The NRC committee which issued the 1996 report on "Carcinogens and Anti-carcinogens in the Human Diet" dismissed concerns on cancer risks to infants and children from food contaminated with carcinogenic pesticides, alleging that these "occur at levels far too low to have any adverse effects on health." Dr. Sam Epstein, acting on behalf of an *ad hoc* coalition of about 100 leading independent experts in public health and cancer prevention, and representatives of a

wide range of labor and citizen groups, warned Alberts that the committee was grossly unbalanced, being disproportionately weighted with industry consultants, and pointed out further that no pediatrician had been invited to serve on the Committee. Alberts responded by admitting “that some of the committee members have performed some consulting for industry,” but dismissed the concerns on grounds that “the same members have also advised or consulted for regulatory agencies”!

A more blatant conflict of interest arose in the composition of the NRC biotechnology panel set up in March, 1999, with disproportionate representation of experts directly linked to industry. It transpired that the panel's executive director, Dr. Michael Phillips, was secretly negotiating for a senior position in the Biotechnology Industry Organization, and joined the industry some 3 months later.

As federal support is beginning to shrink, the NAS plans to increase funding from non-federal sources, which currently account for some 15% of its budget. The NAS is also planning to extend its influence to major national policy concerns. Alberts has refused to release a pending report recommending reorganization of NAS policies and procedures.

All this was revealed in a letter submitted to *Science* magazine, co-signed by Samuel S. Epstein, M.D., School of Public Health, University of Illinois at Chicago and Chairman of Cancer Prevention Coalition, Edward Goldsmith, Editor and Founder of *The Ecologist* and Dr. Mae-Wan Ho of ISIS. The letter was rejected, despite repeated requests for reconsideration from Sam Epstein.

This is not the first time that magazines such as *Science*, *Nature* and *New Scientist* have refused to give voice to scientists dissenting from the corporate view, and they may be plumbing new depths in the current debate in genetic engineering, when undue and apparently unlimited access to their pages is granted to pro-biotech scientists and other supporters of the industry.

Nature Biotechnology (Jan. 2000) published a long report that attempted to discredit a (now published) paper on the potential hazards of the cauliflower mosaic viral promoter in the worst style of gutter journalism; and only gave the authors a very grudging right to reply after a delay of three to four months (see ISIS News #4) when the same offending journalist was allowed to have yet another go (see *Nature Biotechnology* April, 2000). I have long cancelled my personal subscriptions to these magazines.

There is still no open public debate on the abundant scientific evidence of actual and potential hazards of genetic engineering, nor on how scientific evidence ought to be used in the context of the precautionary principle. Some scientists have had their lives and work ruined, not the least by having to read boring scientific papers and reports no one would ever have volunteered to read, if they didn't think it is so important for the public to be informed as to what corporate science has in store for us.

We can have no confidence in any group of scientific advisors who have not been through the open democratic process. The US National Academy of Science report on GM crops was released in April this year amidst fresh controversy. While the Biotechnology Industry Organization (BIO) – the industry's lobby - was delighted by the report, claiming in a press release that GM foods “are thoroughly tested and safe”, critics have rejected the report. US Senator Dennis Kucinich called for the study to be scraped because the panel was “tainted by pervasive conflicts of interest”. Many scientists in the US are among the critics, though *Science* magazine refers to us all as ‘activists’ (*Science*, 14 April, 2000). We have repeatedly invited and challenged those scientists who are still claiming that GM crops pose no special risks to open debate and discussions *in terms that the public can understand*, instead of hiding behind jargon words that defeat even most other scientists. They have turned us down again and again.

MWH

ISIS News 6, September 2000, ISSN: 1474-1547 (print), ISSN: 1474-1814 (online)

Corporatization of Science Threatens Integrity of Science

Top unions launch a Charter for Science, Brian Goodwin reports

The corporatization of science has come to a head. Trade union leaders warn that the integrity of British science is being threatened by “a dash for commercial cash”, reports the Times Higher Education Supplement (Sept 8), the main newsprint for University academics.

An alliance of four leading unions (lecturers' union NAFHE, the technicians' union MSF; the Association of University Teachers AUT and the Institute of Professionals, Managers and Specialists IPMS) launched a “charter for science” at the British Association's Festival for Science at Imperial College last week. The charter will include safeguards for those who blow the whistle on unethical scientists and their practices. An IPMS survey earlier this year found that unethical behaviour is shockingly common: a third of scientists working in government or in recently

privatised laboratories had been asked to change their research findings to suit the customer's preferred outcome, while 10% said there was pressure on them to bend their results to help secure contracts.

In Britain's handful of top research universities, dependence on private sources of income is acute, often amounting to 80-90% of the total research budget. The charter says that research must be guaranteed "by peer review, open publication and by autonomy over a significant proportion of its resources". Commercialisation smashes all three tenets. The only way to be sure that science retains its integrity is to enshrine open and clear-cut whistleblowing, the unions claim.

ISIS News 7/8, February 2001, ISSN: 1474-1547 (print), ISSN: 1474-1814 (online)

'Corporate Take Over of Science' Goes Mainstream

Yet another of the issues that ISIS has been campaigning against is going mainstream. "Is the university-industrial complex out of control?" asked a recent editorial in Nature (Jan. 11, vol. 409, 2001), the top science journal in the UK.

"Links between academia and industry are of increasing concern to academics and to society at large." Academic excellence is being replaced by entrepreneurship - now positively encouraged by government in most industrialised countries. Faculty members of the University of California have been responsible for founding one third of all the world's biotech companies.

What do researchers and universities get out of the industrial ties? Access to industry facilities and databases come top of the list, and of course, financial support for research and opportunities for academics to tap into the market. The downside is a loss of academic credibility and freedom.

Actually the benefits for academics are overstated. The facilities and databases are only of use if the academics' research is in certain fields dictated by the corporate agenda. And funding for researchers is ungenerous to say the least. The take over of U.C. Berkeley's Department of biosciences by Novartis for a paltry sum of \$5 million a year over 5 years is a case in point. Novartis gains a seat in university and departmental research committees and restricts academic freedom to discuss the benefits of the deal. It amounts to indentured labour for academics already selling their souls.

And what remedy does *Nature* suggest? A list of sensible things. These include: vigilance and the ability and determination to speak out; transparency over conflicts of commitment; transparency over conflicts of interest; the need to debate the issues at the national level and dangers highlighted; the obligation on the part of industry to help sustain public trust. All very well, but how to create the conditions where such sensible things could be done.

Perhaps the last paragraph is the most substantial:

"And regional and national governments, although encouraging the university-industrial complex, must keep watch over its development. *They must above all underpin the social value and accountability of public universities with strong financial support.*" (italics ours) It is a matter of restoring democratic control of science to scientists and civil society.

For more on this, read "The New Thought Police" and "The Corporate Take Over of Science", this issue

MWH

The New Thought Police Suppressing Dissent in Science

Mae-Wan Ho and Jonathan Mathews report on the seamless way in which the corporations, the state and the scientific establishment are co-ordinating their efforts to suppress scientific dissent and force feed the world with GM crops.

Science in crisis

Science is in crisis. The full extent of the crisis surfaced when trade union leaders warned that the integrity of British science is being threatened by "a dash for commercial cash" in a report published in the *Times Higher Education Supplement* (Sept 8, 2000), the main newsprint for University academics.

The Institute for Professional and Managers in Specialists carried out a survey of scientists working in government or in recently privatized laboratories earlier this year. One-third of the respondents had been asked to change their research findings to suit the customer's preferred outcome, while 10% had pressure put on them to bend their results to help secure contracts.

In Britain's handful of top research universities, dependence on private funding is acute, often amounting to 80-90% of the total research budget. The four unions representing scientists and technical staff have launched a charter, which says that research must be guaranteed "by peer review, open publication and by autonomy over a significant proportion of its resources". Commercialisation smashes all three tenets. The only way to be sure that science retains its integrity is to enshrine open and clear-cut whistleblowing, the unions claim.

Science has seldom lived up to its ideal as an open, disinterested enquiry into nature, as any scientist who has ever tried to publish genuinely new ideas or findings in the 'peer-reviewed' scientific journals will know too well. Nobel Laureate Hans Krebs' discovery of the metabolic cycle that would eventually bear his name was rejected from the journal *Nature*. Albert Szent-Gyorgyi, another Nobel prize-winning biochemist, never got funded for work on the relevance of quantum physics to living organisms, which is crucial for understanding living organisms and why cell phones may be harmful, for example.

In the course of liberating itself from the Church, the scientific establishment has inherited many of the trappings of fundamentalist religion. There can be but One True Science, and everything else tends to be treated as nonsense or heresy. Within the past 50 years, the suppression of dissent has plumbed new depths, as the scientific establishment is increasingly getting into bed with big business. At first, it was mostly physics and chemistry, now it is pre-eminently biology. And as corporations are growing bigger and more powerful, so the suppression of scientific dissent is becoming more sophisticated, insidious and extensive. As the scientific and the political mainstream have both come to identify with corporate aims, so their established power structures are brought to bear on squashing scientific dissent and engineering consensus. Witness the seamless way in which the corporations, the state and the scientific establishment are co-ordinating their efforts to force feed the world with GM crops, known to be unsafe and unsustainable, and to offer no proven benefits whatsoever either to farmers or consumers [1].

Fall-outs from the Pusztai affair

The GM debate had been going on in the UK and the rest of Europe for at least several years before the press went to town on Dr. Arpad Pusztai's revelation that the GM potatoes tested in his laboratory might not be safe [2]. As a result, Pusztai lost his job and was gagged. Pro-biotech scientists and Fellows of the UK Royal Society vented their collective ire and condemnation. Sir Robert May, the then UK Government's Chief Scientific Officer, said Pusztai had violated every cannon of scientific rectitude. Pusztai's grave misconduct was to 'spill the beans' before the scientific findings went through the proper peer-review process, causing undue public alarm and damaging the biotech industry. His integrity as a scientist was called into question.

In May, 1999, the House of Commons Environmental Audit Select Committee issued a report proposing that members of the public should be appointed to the government bodies responsible for overseeing the safety of GM crops. A week later, however, the House of Commons Science and Technology Select Committee issued its own report arguing that scientific advice should be offered free of any direct input from environmentalists or consumer representatives. The Select Committee was particularly critical of press coverage, and recommended that it should be governed by a code of conduct for accuracy, and that breaches of the code should be referred to the Press Complaints Commission.

The Royal Society simultaneously set up its own hasty review of Pusztai's experimental results [3], without giving Pusztai the opportunity to assemble the complete set of data, published a report declaring Pusztai's findings flawed, and warned that no conclusions should be drawn. The report also reiterated the importance of peer-review before the results are released to the public. The Editor of *The Lancet* referred to the Royal Society's review as "a gesture of breathtaking impertinence to the Rowett Institute scientists"[4].

Box 1

Industry's manipulation and suppression of scientific evidence

Monsanto's machinations in gaining approval of rBGH is notorious [5]. An 80-page report entitled, *Use of Bovine Somatotropin (BST) in the United States: Its Potential Effects*, was published by the Clinton White House in 1994, which concluded, "There is no evidence that BST poses a threat to humans or animals."

Later that year, British scientists revealed that their attempts to publish evidence that rBGH may increase the cow's susceptibility to mastitis (infection of the udder) were blocked by Monsanto for three years. The scientists showed that Monsanto's submission to the FDA was based on selected data that covered up what the experiments had actually revealed – more pus in rBGH-treated cows. Over 800 farmers using rBGH reported health problems with the cows. Side effects included death, serious mastitis, hoof and leg ailments and spontaneous abortions.

Monsanto subsequently offered Health Canada scientists substantial research funding during the rBGH approval process and the Health Canada scientists also complained of being subjected to suppression and harassment during the rBGH approval process.

Two respected investigative journalists were fired from their jobs over a TV documentary on Monsanto's rBGH, alleging significant scientific findings had been suppressed. For example,

insulin-growth factor (IGF-1) was found to increase 10-fold in rBGH milk. Increased IGF-1 is linked to breast, colon and prostate cancers in humans.

Monsanto had also withheld from the FDA data from studies on rats which showed that feeding rBGH elicited antibodies to the hormone and the males developed cysts on the thymus and abnormalities in the prostate gland. Despite all that, rBGH milk is still being sold unlabelled in the US today.

Double standards in the science establishment

However, the Royal Society has never reviewed nor condemned the truly damnable unpublished and published findings on GM crops and products offered by the industry, and accepted as evidence of safety by our regulatory authorities. Nor has it condemned the suppression of scientific evidence by the industry (see Box 1). Neither the Royal Society nor the House of Commons Science and Technology Select Committee has ever found any fault with the exaggerated claims made by industry with regard to the need or benefit of GM crops. There are clearly double standards being applied (see Box 2). Not only that, outright propaganda is legitimate, so long as it is pro-biotech, and publicly-funded scientific research institutions are openly engaging in this exercise (see Box 3).

Box 2

Communicating science: sound science's double standards

The treatment of Dr. Arpad Pusztai constitutes one of the most notorious examples of double standards. Pusztai attended the OECD conference in Edinburgh on the Scientific and Health Aspects of Genetically Modified Foods [6], where a series of speakers questioned his integrity, despite the fact that at least part of the research in question had, by then, been published in *The Lancet*.

In contrast, Professor Zhangliang Chen, Vice-President of Beijing University, met with almost universal approval after telling the conference that rats fed on GM foods in China showed no adverse effects, entirely on the basis of unpublished research and without any detail on design or methodology. Pusztai recalled people were even coming up to tell him that Prof Chen had shown when you do the experiments right, you get the right results![7]

The Royal Society Guidance on how to suppress unpalatable truths

The Royal Society then drew up a "Guidance for editors", which is reproduced with strong approval in a subsequent House of Lords Select Committee on Science and Technology Report on Science and Society [15]. It looks suspiciously like the 'code of practice' that the House of Commons Science and Technology Select Committee had in mind to counteract the press 'hysteria' over the Pusztai affair. It begins by quoting the Press Complaints Commission Code that, "newspapers and periodicals must take care not to publish inaccurate, misleading or distorted material", and warns, "Editors must be able to demonstrate that the necessary steps have been taken".

"Journalists", the Guidelines states, "must make every effort to establish the credibility of scientists and their work". The Royal Society will publish a directory that provides a list of scientists. Before interviewing any scientist, the journalist will be expected to have consulted the officially nominated expert in the field, who will be able to say whether the scientist in question holds correct views.

"Newspapers may suppose that they have produced 'balanced' reports by quoting opposing views". Not so, according to the Royal Society, if "the opposing view is held by only a quixotic minority." Journalists are told to identify, wherever possible, a majority view, and that is the one they should present. The majority view may turn out to be wrong, but such instances, we are told, are the exceptions rather than the rule.

But the mainstream majority has all too often been mistaken! It has been mistaken over nuclear power, climate change, and the link between BSE and new variant CJD, to name but a few glaring examples. And it is thanks to journalists reporting minority views that pressure is brought to bear on the mainstream majority to change their stance. By then, unfortunately, much damage has already been done. It would have been far worse if the minority views had never got a hearing at all.

The Royal Society acknowledges that it is important for scientists to communicate via the media, but is concerned that some scientists may be seeking publicity to further their careers or to make exaggerated claims. This is blatantly absurd and insulting to scientists like Pusztai and others who lost their research grants and jobs for expounding unpopular views and unpalatable findings. To counter this, the Royal Society wants the media to contact "scientific advisers" (again, presumably supplied by the Royal Society) who could establish the authenticity of any story.

Box 3

Biospinology at the John Innes Centre

The John Innes Centre (JIC) is Europe's leading plant biotechnology institute, which promotes itself as an expert and impartial source of scientific information. The JIC's science communication activities encompass public meetings, press articles, advice to political leaders, exhibitions, a special GM website, a school project, and school plays. It also hosts the Teacher Scientist Network that links about 100 science teachers in schools with the JIC.

'Biotechnology in Our Food Chain', the JIC's UK schools' project on GM, funded largely by Lord Sainsbury's Gatsby Trust, as well as being currently available on the web [8], will soon be made available to schools on CD-ROM. The JIC claims that the project takes note of the "various viewpoints".

One section of the project that allows expression of those viewpoints is 'Meet the Experts'. It poses the question: "Do you believe that genetically modified food is, potentially, of great value in improving the health of the population? For example, if the 'super broccoli' (containing significant anti-cancer qualities, for example) was a big success and consumed on a large worldwide scale, what statistical changes do you think we may notice (long term) for problems such as cancer/heart disease etc?"[9].

John Lampitt of the National Farmers Union Biotechnology Working Group, waxed lyrical: "I believe there are exciting possibilities for improving the nutritional qualities of foods by genetic modification and these changes may eventually lead to improved diet and health in whole populations."

However, it is perfectly possible through conventional breeding to produce such a broccoli. Indeed, it has already been produced by a team at the JIC itself [10]!

Prof David Baulcombe heads the JIC's prestigious Sainsbury Lab-oratory as well as its Plant Molecular Virology Group. He told a public meeting about some unpublished US government research, which shows that GM crops brought enormous environmental benefits, including increases in the diversity of insects, small mammals and birds of prey in areas where insect-resistant GM corn and cotton were grown. Despite repeated subsequent requests, Prof Baulcombe has been unable to provide any evidence to substantiate the existence of such a report.

Prof Baulcombe also told the same meeting that in the famous Monarch butterfly research, the butterfly larvae were harmed more or less equally by non-GM and GM corn pollen. This is complete fabrication and Baulcombe's comments have been strongly refuted since by Dr John Losey[11], the principal author of the research that in fact showed pollen from GM maize alone was lethal to the Monarch butterfly larvae[12].

A play commissioned by the JIC together with its Teacher Scientist Network is intended to tour UK secondary schools. Its information pack for teachers describes how the project was developed in such a way as to ensure that the script, the structured debate which accompanies the play, and the information pack itself, provide "unbiased and representative coverage of the range of viewpoints that exist". It also states that all the would-be script-writers were required to participate in a "laboratory day" on GM involving a wide range of viewpoints. However, author Luke Anderson who was present at the laboratory day reports that he was the only person there who was not pro-GM. "I was totally outnumbered with everyone else from industry etc. I complained that it was unfair for there just to be me against GE in the room." [13]

Dr Jeremy Bartlett, who trained in the John Innes, attended a production of the play, and described the event as a "carefully crafted exercise in manipulation". The play is very entertaining, he said, and well written, but its message for young people strongly reflects the views of those who commissioned it. "The GM campaigner looks ridiculous, behaves deviously, has no proper arguments against GM and loses the girl. His fiancée listens to the rational scientist and furthers her career by promoting GM foods" [14].

On the matter of "uncertainty", "journalists should be wary of regarding uncertainty about a scientific issue as an indication that all views, no matter how unorthodox, have the same legitimacy." The Royal Society insists, once again, that it is peer review that confers legitimacy on scientific claims.

The Royal Society has broken new ground in attempting to exercise control over the press. It has been established practice for decades, if not centuries for new scientific results to be presented at conferences before they have been subjected to peer review and published. Peer review is not and never has been a precondition for research being brought to the attention of the public.

More to the point, where there is the possibility of danger to health or to the environment, it can be totally counter to public interest to wait for peer review. It took Pusztai nearly two years to

get part of the work published. And in the final hours, a fellow of the Royal Society, Peter Lachmann tried to prevent the paper appearing in print [16]. Holding back on a scientific claim until everything is settled is one thing; not alerting the public soon enough to a possible danger is another.

Tom Wakeford, who has a regular column in the journal *Science and Public Affairs*, wanted to round up the year's events in 1999 as "an *annus horribilis*" for "the Royal Society, and a host of previously respected UK Scientific institutions". "After decades of almost sleepy acquiescence with science, journalists are seeking out the instances of cronyism, censorship and spin-doctoring from which they had previously seen scientists as being somehow aloof." Tom was given the veto by the editor of the journal, Alun Roberts, who withdrew his column, on grounds that Fellows of the Royal Society "wouldn't like it". The journal is officially independent, as it is published by the British Association for the Advancement of Science, and some of its funding comes from the Royal Society.

The House of Lord decree that no question should be asked about safety

For good measure, the House of Lords Select Committee adds several comments, the first aimed at discouraging sensational headlines such as those that might damage the image of GM crops; the second, incredible as it may seem, attempts to purge the word, "safe" from the vocabulary of the media. "The very question "Is it safe?" is itself irresponsible, since it conveys the misleading impression that absolute safety is achievable."

This frontal attack on the English language is actually a veiled attempt to undermine the precautionary principle in its most important form, which can truly safeguard human health and the environment. It entails a reversal of the present onus of proof. In other words, instead of requiring civil society to prove something *harmful* before it can be withdrawn or banned, perpetrators should have to prove something *safe* beyond reasonable doubt before it can be approved, especially where the product is of no proven benefit to society.

Scientists too, must be reined in

That is by no means the end of the story. Recently, a detailed Code of Practice on Science and Health Communication was launched jointly by the Social Issues Research Centre (SIRC) and the Royal Institution, to address concerns about the ways in which some issues are covered in the media, unjustified 'scare stories' as well as those "which offer false hopes to the seriously ill". It also claims to be in response to the call for such a code by the Select Committee on Science and Technology.

The code is aimed not only at journalists but also at scientists. A draft of the code recommended journalists to consult only with 'expert contacts', a secret directory of which will be provided only to "registered journalists with bona fide credentials". It discouraged scientists from disclosing unpublished results even at professional scientific meetings, thus breaking with a time-honoured tradition of open communication among scientists.

The Royal Institution has long been involved in presenting science to the public, but its Director, Susan Greenfield, is also an advisor to the SIRC. The latter, it turns out, is a metamorphosed social research company which boasts of its ability to provide corporate clients with effective public relations via its 'positive research'. The SIRC is both directly and indirectly funded by the food industry[17].

The RI/SIRC Code of Practice is apparently endorsed by a list of mainstream scientists and science journalists: Sir John Krebs, Head of the Food Standards Agency and Lewis Wolpert, Fellow of the Royal Society and member of its Committee for Public Understanding of Science (COPUS), both well known for their pro-GM stance; Susan Greenfield, Director of the Royal Institution; Lord Wakeham, Chair of the Press Complaints Commission and Lord Dick Taverne, author, journalist and politician, another rabid protagonist for the biotech industry.

Although the general impression the Code attempts to convey is that of wishing to prevent both 'scare stories' and 'hype', it is no different in substance to the original Royal Society Guidelines to editors. It is intended to promote the mainstream, establishment view and at the same time to suppress minority, dissenting voices.

The Code demands that known affiliations or interests of the investigators should be clearly stated; and that this applies not only to "researchers who are attached to, or funded by, companies and trade organisations but also to those who have known sympathies with particular consumer pressure groups or charitable organisations". The two cases are, however, clearly not equivalent. For researchers funded by companies, there is everything to be gained in terms of both scientific repute and monetary reward in promulgating the corporate agenda. For scientists who go against the grain, there is everything to be lost, including job and career.

The Code goes on to state, "It should be recognised, however, that a particular affiliation does not rule out the potential for objectivity.... All scientists are paid by somebody". This is a flagrant attempt to blur the distinction between publicly funded scientists whose allegiance is first and foremost to civil society, and those in the pay of unaccountable corporations dominated by the profit motive.

The Code is keen to prevent any overstatement of risk but has not a word to say about the danger of false reassurances – something that goes to the very heart of the BSE disaster.

In January 2001, announcement was made of a new science media centre, supported by UK Science Minister Lord Sainsbury, to be housed in the Royal Institution headed by Susan Greenfield. Its aim is to help "sceptical and impatient journalists" get their stories right on controversial issues such as "animal research, cloning and genetically modified food" [18].

The corporate takeover of science is the greatest threat to survival

Britain might be mistaken for a Third World country, says a newspaper headline at the beginning of year 2001: chaos on the rail network, protests over fuel price increases in the midst of the worst storms and floods in decades, and a vCJD epidemic that may claim up to tens of thousands of lives. Mad cow disease, or BSE, is now spreading to the rest of Europe, raising new fears that vCJD may follow in its wake.

The BSE report, published at the end of October 2000, blames persistent government denials over the link between vCJD and BSE beef based on the 'best scientific advice' given by the Southwood Committee in 1989, which concluded "it was most unlikely that BSE will have any implications for human health". The 'best scientific advice' is saying the same about GM crops. The scientific establishment has failed, again and again, to acknowledge that science is by its nature incomplete and uncertain and to insist on the precautionary approach. The precautionary approach might also have averted global warming, had it been adopted ten, twenty years earlier.

If climate change and the CJD fiasco can teach us anything, it is that science is too important to be left to the politicians or to a scientific establishment in bed with big business. Our academic institutions have given up all pretence of being citadels of higher learning and disinterested enquiry into the nature of things; least of all, of being guardians of the public good. The corporate take over of science is the greatest threat to our survival and the survival of our planet. It must be resisted and fought at every level.

We must reject the imposition of any Code of Practice designed to suppress open scientific debate and discussion. Instead, concerted effort must be made by independent journalists and scientists to promote genuine, critical public understanding of science, so that the widest cross-section of civil society may be empowered to participate in making decisions on science and technology. Only then, can we hope to restore democratic control of science to scientists themselves and to civil society at large.

1. See World Scientists Open Letter to All Governments on GMOs for a review of the evidence. Institute of Science and Society website www.i-sis.org
2. "Pusztai publishes amidst fresh storms of controversy" *ISIS News*#3 December, 1999 www.i-sis.org
3. Review of data on possible toxicity of GM potatoes, The Royal Society, June 1999.
4. "Health risks of genetically modified foods", Editorial, *The Lancet* 353, May 29, 1999.
5. See Fox, M. (1999). *Beyond Evolution*, Chapter 5, The Lyons Press, New York.
6. See "OECD agenda: "there is no evidence that GM foods are harmful"", Arpad Pusztai, *ISIS News*#4, March 2000.
7. <http://members.tripod.com/~ngin/watchingdrpusztai.htm>
8. <http://www.jic.bbsrc.ac.uk/exhibitions/bio-future/index.htm>
9. <http://members.tripod.com/~ngin/broccoli.htm>
10. "False reports and the smears and men" Jonathan Mathews, *GM-FREE*, vol 1, no. 4, pp. 8-14 Also viewable at: <http://members.tripod.com/~ngin/false.htm>
11. Complete transcript of the public meeting at: <http://members.tripod.com/~ngin/lyngtr.htm>
12. "Trangenic pollen harms monarch larvae" Losey, J.E. *et al*, *Nature* 399, 214, 1999.
13. <http://members.tripod.com/~ngin/biospin.htm>
14. "Sweet as you are" Jeremy Bartlett, *Splice* 5, 16. Also viewable at: <http://members.tripod.com/~ngin/articlebartlett.htm>
15. See "Trust me, I'm an expert" and "How to engineer society to accept science as usual", Mae-Wan Ho, *ISIS News*#4, March, 2000 <www.i-sis.org>
16. See "Concern for science", Tom Wakeford, *The Times Higher* March 24, 2000.
17. "Bad company, reporting the business of science", Jonathan Mathew, Norfolk Genetic Information Network(ngin), <http://members.tripod.com/~ngin>

18. "New independent media centre aims to give scientists a voice" *The Financial Times*, Jan 30, 2001

The Corporate Take over of Science

Captive State: The Corporate Takeover of Britain by **George Monbiot**, MacMillan, London, 2000.
Review by **Mae-Wan Ho**

The corporate take over is here and threatening the foundations of democratic government. That is the message of George Monbiot's explosive and important book. Corporations have seized control of our hospitals, schools and universities. They have infiltrated the government and come to dominate government ministries, buying and selling planning permission, dispensing our tax money to research and development that benefit industry, taking over the food chain. To top it all, the British Government has colluded in ceding its power to international institutions controlled by corporations, such as the World Trade Organization, the World Bank and the International Monetary Fund. Anyone who is under the delusion that corrupt or corrupted governments are only in the Third World has better think again.

The chapter on corporate takeover of universities is too close to home. I have been on the permanent academic staff of the Open University since 1976, but was strongly encouraged to take early retirement last June as I became more and more involved in the genetic engineering debate.

In the course of the genetic engineering debate, I had begun to realise that the corporate take over of science was the greatest threat to democracy and to the survival of our planet [1]. That was why I co-founded the not-for-profit Institute of Science in Society (ISIS) to work for social responsibility and sustainable approaches in science and the integration of science in society. As part of the agreement for my retirement, I was to be given an honorary secondment, so I could continue running ISIS from the University, while making it clear it was independent from the University. The situation soon began to rapidly deteriorate, however.

In August, less than two months after my retirement, my research assistant and I were both officially banned from the University campus. Huntingdon Life Sciences (HLS) alleged in a letter and phone-call to my head of Department that I was in possession of certain internal papers belonging to them. Huntingdon Life Sciences is a privately-owned laboratory, at the time doing contract research for the biotech companies, among them Imutran, a subsidiary of the corporate-giant Novartis.

The University made no attempt to communicate with me or with my assistant before imposing the ban. Had they done so, they would have found that HLS' accusation was false. I was sent some papers by a group campaigning for animal welfare, who were helping me obtain published scientific papers on cross-species organ transplant – the experiments being carried out in HLS for Imutran - so that ISIS could prepare a scientific critique, which we did [2]. The internal papers were never used and have been destroyed since, as I judged that there was enough in the scientific literature to damn the whole project on safety and moral grounds.

But the chief of HLS, Brian Cass, tried to intimidate me, in phone calls, and in an e-mail, to get me to reveal the identity of the campaigning group. I refused to do so.

When I went on campus to prepare my reply to the ban, the Sub-Dean of Science came into my office and threatened to have me removed physically with the security guard.

After days on the telephone to my Union representative, the Dean of Science agreed to see me. Months later, the ban was lifted for myself, but my for my assistant; the University denied that she had, in fact, been given an honorary research fellowship a year earlier. I was further barred from using University facilities for ISIS.

The animal welfare group, Uncaged Campaigns, has gone public since with a 150 page report leaked to the press, documenting excessive suffering of animals at HLS, and Imutran's exaggeration of the success of the pig to primate organ transplant research. Imutran has brought an injunction against Uncaged Campaigns to prevent the release of the report. But just four days after the news broke, Novartis announced the closure of Imutran, and the removal of the research to the United States. Nevertheless, Novartis has pursued the case against Uncaged Campaigns to full trial and won. Since then there has been a plethora of prominent articles in the mainstream press condemning animal rights activists and defending Huntingdon Life Sciences.

George Monbiot gives many more examples of similar treatments university administrations mete out to academics daring to dissent from the corporate agenda or to criticise it. The Centre for Human Ecology, founded by distinguished evolutionist and geneti-cist C.H. Waddington more than 30 years ago, was hounded out of Edinburgh University in 1996, essentially for raising questions in both the scientific and popular press about the Conservative Government's

science policies. Academic and government scientists are all too often asked to falsify data in order not to offend corporate funders.

"Today, there is scarcely a science faculty in the United Kingdom whose academic freedom has not been compromised by its funding arrangements. Contact between government-funded researchers and industry, having once been discouraged, is now, in many departments, effectively compulsory ...our universities have been offered for sale, with the result that objectivity and intellectual honesty are becoming surplus to requirements."

The sell-out began under the Conservative Government, and with science research funding which effectively controls what kinds of science would be done. The 1993 white paper on science called *Realizing our Potential*, intended to "produce a better match between publicly funded strategic research and the needs of industry". The research councils, which distribute most of the public money for science would be obliged to develop "more extensive and deeper links" with industry. They would be required "to recruit more of their senior staff from industry".

The Labour government extended those reforms enthusiastically. Its 1998 white paper on competitiveness launched a 'reach-out' fund to encourage universities to "work more effectively with business". The role of the higher education funding councils, which provide the core money for universities, was redefined "to ensure that higher education is responsive to the needs of business and industry".

Thus, it comes as no surprise that the Biotechnology and Biological Sciences Research Council (BBSRC), the main funding body for Britain's academic biologists with an annual budget of £190m, is chaired by Peter Doyle, an executive director of the biotech corporation, Zeneca. Among the members of its council are the Chief Executive of the pharmaceutical firm Chiroscience, the former Director of Research and Development of the food company Nestle; the President of the Food and Drink Federation; the general manager of Britain's biggest farming business and a consultant to the biochemical industry. The BBSRC's strategy board contains executives from SmithKline Beecham, Merck Sharpe and Dohme and Agrevo UK (now subsidiary of Aventis, the company responsible for getting the Department of Environment, Transport and the Regions (DETR) to support the controversial 'farm-scale' field trials with £3 million of taxpayer's money). The Council has seven specialist committees, each overseeing the funding of different branches of biology. Employees of Zeneca sit on all of them.

The BBSRC was established in 1994 to replace the biological program previously run by the Science and Engineering Research Council (SERC). Whereas SERC's mandate was to advance science of all kinds. The BBSRC's purpose is "to sustain a broad base of interdisciplinary research and training to help industry, commerce and Government create wealth".

The BBSRC's press release falls into three categories: news about the research grants it allocates, news about the findings resulting from those grants, and fierce attacks on critics of genetic engineering. Arpad Pusztai's publication in *The Lancet* was condemned as "irresponsible". When Friends of the Earth released the results of research showing that GM oilseed rape pollen was being carried four and a half kilometres (well beyond the legal 'isolation distances'), the BBSRC issued a statement that the finding was "a distraction from the key issues".

Gene biotechnology research is swallowing up the lion's share of the research funds. In January 1999, the BBSRC set aside £15m for "a new initiative to help British researchers win the race to identify the function of key genes". In July the same year, £19m was to be spent on new research facilities to "underpin the economic and environmental sustainability of agriculture in the UK" through "work on genetically modified crops". In October, £11m were allocated to projects that would enable the UK "to remain internationally competitive in the development of gene-based technologies". Every year, the Council gives more than £10m in grants to John Innes Centre in Norwich, the genetic engineering institute which houses the Sainsbury Laboratory and has a research alliance with Zeneca and Dupont.

The BBSRC also funds the secondment of academics into corporations to "influence basic research relevant to company objectives". The Council launched a Biotechnology Young Entrepreneurs Scheme, "aimed at encouraging a more entrepreneurial attitude in bioscientists". It has paid for researcher to work for Nestle, Unilever, Glaxo Wellcome, Smith-Kline Beecham, AgrEvo, Dupont, Rhone Poulenc and Zeneca.

Most telling of all, scientists working in university departments receiving BBSRC grants are formally gagged to prevent them becoming "involved in political controversy in matters affecting research in biotechnology and biological sciences". In practice, however, scientists can hype biotechnology to their heart's content. The gagging is strictly aimed at critics.

The same pattern of corporate takeover is repeated in the other research councils, the Natural Environment Research Council (NERC) and the Medical Research Council (MRC).

I recently visited the MRC website and found that an extra £1.9 billion is to be committed to “health genomics research” over the next five years [3]. That is in addition to the Government’s projected spending of £675m on university infrastructure through the Science Research Investment Fund, which includes high tech facilities for studying genes and proteins.

A number of the MRC proposals are controversial to say the least (see “Human Studies on GM Food Risks”, and “UK population DNA database to be established”, this issue).

George has confirmed what many people already suspect and have experienced in their personal struggles for freedom and democracy in different spheres of life. What can we do in the face of the ever-increasing consolidation of corporate control? Monbiot has only one answer: don’t despair, fight on!

“The struggle between people and corporations will be the defining battle of the twenty-first century. If the corporations win, liberal democracy will come to an end. The great social democratic institutions which have defended the weak against the strong – equality before the law, representative government, democratic accountability and the sovereignty of parliament - will be toppled. If, on the other hand, the corporate attempt on public life is beaten back, then democracy may re-emerge the stronger for its conquest. But this victory cannot be brokered by our representatives. Democracy will survive only if the people in whose name they govern rescue the state from its captivity.”

This book is meticulously researched and scholarly, but despite the seriousness of the subject matter, it is refreshingly well written. The style of the prose is pleasantly evocative, light and engaging, even when his message is at its most uncom-promisingly radical.

1. *Genetic Engineering Dream or Nightmare? Turning the Tide on the Brave New World of Bad Science and Big Business*, by Mae-Wan Ho, Gateway Gill & Macmillan, 1998, 2nd ed., 1999.
2. Xenotransplantation: How bad science and big business put the world at risk from viral pandemic. ISIS Sustainable Science Audit #2, www.i-sis.org
3. “MRC SCIENCE BUDGET ALLOCATION ENABLES FURTHER DEVELOPMENT OF HEALTH GENOMICS RESEARCH” MRC Press Release MRC/69/000, 22 November www.mrc.ac.uk

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Senior Scientist Sacked Defending Academic Standards

This is yet another blatant example of a university administration in bed with corporate business, and all too ready to sacrifice academic standards and academic freedom for commercial reasons. How you can help. Dr. Mae-Wan Ho reports.

Tenured Associate Professor Ted Steele, internationally renown for his pioneering work in immunogenetics, has been a tenured staff member of the University of Wollongong for 16 years when he was dismissed without notice on February 26 2001. The Vice Chancellor Gerard Sutton accused him of “knowingly spread false allegations” about the University. This amounted to no more than publicly opposing the upgrading of student marks. The grades of two students were upgraded within Steele’s department, against his recommendations and those of an external referee. Steele rejected demands from Sutton to withdraw his remarks.

Ted Steele says his position has always been very simple, “ I knowingly spread the truth about a shonky B.Sc/B.Biotech Hons assessment process which allowed fail/borderline pass students to be upgraded to mid range pass (Hons 2. II) or PhD entry (Hons 2.I) against expert evaluation and opinion”.

The story hit the press when Steele was interviewed by a journalist asking him to comment on a nation wide survey of academics carried out by the Australia Institute [1]. The results made it plain that Steele was not alone in his concerns. The survey found widespread dissatisfaction with the erosion of academic freedom, with many respondents complaining of management pressure to produce “commercially favourable research and student results”.

Of the 165 teachers and researchers who responded, 92 percent expressed concern about the general state of academic freedom. Of those, 81 percent blamed the increasing commercialisation of their university.

Almost one in five reported that they had been prevented from publishing contentious research results, and 41 percent said they had experienced discomfort with publishing such results.

Almost half had experienced reluctance to criticise institutions that provided large research grants or other form of support. Approximately 5 percent said they had experienced pressures to admit and pass full fee-paying students and more than a quarter expressed low levels of satisfaction with the freedom to determine student standards.

Sutton dismissed Steele in the midst of a campaign by the Australian Universities Vice Chancellors Committee, joined personally by the federal Education Minister David Kemp, to

denigrate and discredit the Australia Institute survey, in order to protect the Australian tertiary education sector's \$3.4 billion-a-year market among overseas fee-paying students, particularly from Asia.

In the weeks following, staff members at Wollongong and other universities began to voice concerns about Steele's case. On March 29, about 60 staff members attended a union meeting at Wollongong University and overwhelmingly passed a resolution stating that the dismissal set a precedent that "if not fought, is a threat for every member of staff".

Michael Head, lecturer of law in the University of Western Australia drew attention to context of Steele's dismissal: the slashing of government funding and the general restructuring of universities along business lines, which sounds all too familiar for those of us in Europe and the United States.

The Howard government has slashed tertiary education funding by some \$800 million a year since 1996, forcing universities to increasingly rely upon private student fees, corporate sponsorship and business research partnerships. Even basic teaching must now be financed from such sources.

"For their part, university managements have engaged in cut-throat competition with each other, vying for big business backing and launching their own commercial enterprises." Michael Head said. Wollongong University has been at the forefront of this drive. For the past two years, the government has named it "University of the Year" largely on the strength of its success in attracting corporate patronage.

Just two weeks before sacking Ted Steele, the university announced a new \$2.5 million grant from resources giant BHP to fund the BHP Institute of Steel Processing and Products for five years. According to its media release, the university "collaborates with BHP on projects ranging from steel processing metallurgy and coatings technology to management of innovation and technological change". BHP, whose nearby Port Kembla steel plant is

Wollongong's biggest polluter, also funds the university's chair of Environmental Science.

According to Head, similar contractual commitments are becoming prevalent at all universities. In a submission to a Senate committee inquiry into higher education,

Queensland University academic Dr William De Maria reported that large companies have funded some 100 professorial posts at universities.

These ranged from the Colgate-Palmolive chair of general dental practice at the University of Queensland to the Microsoft chair of computing at Macquarie University and the University of Western Sydney's chair of gambling research (!), funded by Aristocrat, Australia's largest poker-machine manufacturer.

"Ted Steele's dismissal is a warning that these arrangements and the accompanying ideological climate are increasingly incompatible with free speech. His sacking is a test case for the defense of academic freedom and tertiary education itself." Head calls on students and all those concerned with public education and democratic rights to join in demanding his immediate reinstatement".

"Reinstatement at age 52 yrs is the only possible outcome for me" says Ted Steele, "the second option is winning massive compensation for damages in the courts- but I need to be reinstated so I have some infrastructure to continue my research until normal retirement at age 65 years."

The University of Wollongong management was served with a Federal Court action by the Australian National Tertiary Education Union (NTEU), and the case comes up in the week of July 23-27 under the Australian Federal Industrial Relations commission in Sydney.

An e-mail/Internet site was set up by the NTEU to have Ted Steele reinstated. ISIS has reported and circulated the story widely, and more than 5,000 have signed the NTEU petition so far.

On June 8, Wollongong University's 18-member governing council met to debate Steele's case. Vice Chancellor Gerard Sutton used his privilege as first speaker to block the debate and to get a motion adopted to await the outcome of the legal proceedings against the University.

But the fuse has been ignited. There is widespread international support for reinstating Ted Steele and condemnation of Wollongong University. The president of the 30,000-member Canadian Association of University Teachers, Professor Thomas Booth, wrote: "The Vice-Chancellor's actions show contempt for academic freedom, which is the cornerstone of any university. His actions bring the University of Wollongong into disrepute and cast a shadow over the entire Australian university community."

Britain's Association of University Teachers general secretary David Triesman said his union had called on British academics to avoid all dealings with Wollongong University because,

"The standards universities must follow have to include an exacting requirement to foster and support academic freedom. This is sometimes tested when criticisms come close to home, but that is a test no university can afford to fail."

Nine prominent Australians sent an open letter to the university council stating that the university's actions "are cause for concern for all members of the academic community, and more broadly among members of the public who care about the integrity and accountability of public universities". The letter insisted that "academic freedom is a right and responsibility of academic staff" which "entails the right of all staff to freely express opinions about the institutions in which they work".

Eminent science professors Frank Fenner and Ian Lowe signed the letter, joined by novelists Jean Bedford and Peter Corris, composer Roger Woodward, media commentator Eva Cox, Liberty Victoria president Chris Maxwell, Association for the Public University president Paul James and Australian Council of Trade Unions (ACTU) president Sharan Burrow.

The NTEU has received some 2,000 messages of support from academics and faculty unions around the world, including Europe, Asia and South Africa.

Nevertheless, the NTEU has come under criticism for remaining "silent on the key question raised by Steele and many other academics - the subordination of the universities to market requirements" [2].

Statistics released by the Australian Vice-Chancellors Committee on May 29 show some of the impact of budget slashing and restructuring in universities in the continuing deterioration in student/ staff ratio. Between 1989, when the Labour government launched a major reorganisation of the university system, and 2000, the ratio rose by 40 percent, from 13.50 to 18.84.

These figures translate into larger classes, over-crowded facilities and less attention paid to students, increased workloads and stress for staff. Again, this rings familiar to all of us in Europe and the United States.

Ted Steele's sacking has become "a critical test for the defence of academic freedom and the future of tertiary education itself".

What is at stake is not just academic freedom or academic standards. It is the freedom to research by dedicated, independent scientists who have not been corrupted by the corporate take over.

Please add your name to the petition, send the web address to others, asking them to do the same. <http://www.nteu.org.au/rights/wollongong.html>

1. A story on the Australia Institute survey (on declining academic standards in Australia) is in the current issue of the ANU Reporter at: <http://www.anu.edu.au/pad/reporter/>
2. "Australian university refuses to reinstate sacked academic" By Mike Head, World Socialist Web Site on Ted Steele's case: <http://www.wsws.org/articles/2001/jun2001/acad-j19.shtml> 19 June 2001

Big Business=Bad Science?

Commercial pressures are distorting academic science and society is not getting the full benefit from the science it is paying for. Prof. Peter Saunders and Dr. Mae-Wan Ho report on a recent conference in London.

"Corruption of Scientific Integrity? The Commercialisation of Academic Science" was the title of a day long meeting held in the British Academy, 2 May, under the auspices of the Council for Academic Autonomy and the Council for Academic Freedom and Academic Standards. The room was filled to capacity, and people had been turned away.

"Down which river has academic science been sold?" began John Ziman in a provocative mood. Ziman, well known both as a physicist and for his work on the social responsibility of science, argued that there are two kinds of science: "instrumental" and "non-instrumental". The first is generally directed towards practical ends, wealth creation, improving health, preserving the environment, and so on, which are foreseen at the outset. It is also generally proprietary (someone owns the results), local, limited (to foreseen problems and needs), and partisan.

In contrast, the goals of non-instrumental science are not so clearly defined. It lays the foundation for instrumental science, and fulfils other roles as well. It provides trustworthy knowledge of the world and of ourselves, and is a source of wonder. It helps us develop an attitude of critical rationality, reminding us not to accept without questioning, dogmas, theories, 'facts' or authority. It is a source of non-partisan expertise, a necessity in an age when governments require scientific advice in taking many decisions. Non-instrumental science is public, available to all, imaginative, self-critical and disinterested. It has traditionally been largely carried out in universities, though also to some extent in government sponsored laboratories.

Society needs both kinds of science, but there is an increasing tendency to focus on practical utility to the exclusion of everything else. This leads to a new 'post-academic' culture in which everything, in universities as in industries, is directed towards practical instrumental values. All the UK research councils except PPARC (Particle Physics and Astronomy) have wealth creation at the top of their missions, and Ziman reminded his audience that particle physics too got its big push during and after the war on practical grounds. But post-academic science cannot perform many of the functions society requires of science, and so by treating all science as a saleable commodity, society risks losing many of the benefits.

If non-instrumental science is to survive, Ziman said, we need new structures, funding arrangements, contracts of employment and even a new culture within science itself. He did not suggest what these might be, but told the meeting that developing them must be a high priority for the scientific community.

In our view, the separation between instrumental and non-instrumental science along the lines of propriety and partisanship is already a cop-out. No knowledge should be owned or biased. We are in danger of lowering our standards to serve the new regime, and really selling science into corporate serfdom.

The second speaker, Professor Nancy Olivieri, described her travails at the Toronto Hospital for Sick Children, part of the University of Toronto. She had been working on Deferiprone, a drug for treating the blood disease thalassaemia. The first results had been encouraging, but the researchers later became concerned about the level of toxicity. The company involved, Apotex, made great efforts to prevent her from informing her patients and other scientists.

The result has been a long legal battle, in which the University has sacked and reinstated her several times. Olivieri acknowledged the support of colleagues and of her union, the Canadian Association of University Teachers (CAUT). She knew of similar cases in other universities, and it was significant that in none of them had the institution supported its staff. She herself had been relatively fortunate, she said, because the company's actions had been overt: they had written her letters and left messages on her answering machine. In many cases, the pressures are covert. You just don't get the grant or the job, and however convinced you may be about the reason, there is no evidence that will stand up in a court.

Olivieri pointed out that to conceal information about possible toxic effects is a violation of the Hippocratic oath, which incorporates the precautionary principle. Contracts that require such information cannot be binding in Canada because they violate the common law provision that a contract may not contain a clause that is against public policy.

Many in the audience were aware of another incident that had been reported in the press shortly before the meeting, and which also involved the University of Toronto. David Healey, a British psycho-pharmacologist, had been offered, and accepted, a post in the Centre for Addiction and Mental Health (CAMH) at the University. In November, he spoke at a conference that was being held at CAMH, and claimed that the highly profitable drug Prozac could cause people to attempt suicide. The job offer was withdrawn within a week. Eli Lilly, the makers of Prozac, is a major funder of CAMH, but both the company and the University denied they exerted any influence on the decision. The Canadian Association of University Teachers has, however, described the affair as "an affront to academic freedom in Canada."

Like the other speakers, Sir David Weatherall, who recently retired from the Institute of Molecular Medicine, University of Oxford, accepted that there has to be cooperation between universities and industry. This will inevitably lead to problems, which we must try to solve. What John Ziman had called non-instrumental science was also important even from a practical point of view. When medical students were asked which discoveries are the most important for the treatment of disease, over half those they named arose out of 'curiosity based' research. If we concentrate on goal-directed science, we may fail to solve the really important problems.

There is a problem with clinical research because it is seen as close to market and therefore something that industry, not governments, should pay for. But this can lead to conflicts of interest or bias when the investigators are financially linked to the company. There can be great contractual pressures, and Nancy Olivieri's story was very much the tip of the iceberg.

There is also evidence that someone who has an interest in the outcome is more likely to produce a positive result. The learned journals have been slow to note conflicts of interest. Weatherall described as "not uncommon" a practice known as ghosting, in which scientists working for a company write a paper and pay an outside academic to be the "author".

One of the problems is patent law, which he described as being "in a mess", at least so far as biological material is concerned. What should be patentable is a novel use, but the law is at best not clear on this point. If it is possible to own genes, that can hinder research.

Weatherall stressed the need for safeguards at the interface between universities and industry. There must be reduced pressure for short-term gains and a rationalisation of the patent laws on biological material. Journals should demand statements about possible conflicts of interest. There should be more protection for scientists. This is difficult to achieve because the usual pressure on them is simply a failure to fund them, but it would be a step forward to have review panels to sort out problems. Weatherall also urged that young scientists should be taught how to deal with industry; he felt that both scientists and the universities were naïve, and easily taken advantage of.

The final speaker George Monbiot began by apologising for arriving late; he had been at a meeting on the corporatisation of agriculture, which gave an idea of how pervasive is the problem of corporate takeover. Scientists must join up with the general struggle of society, he admonished.

He reminded the meeting that because the government sees science as a driver of the growth economy, it ties funding more and more to the needs of business. Industry has more and more influence in universities. One way is by giving money to departments that are involved in research that directly affects the company. On the face of it, this might seem natural enough, but when combined with the general shortage of funds, and the presence of many industrialists on Research Council boards, the result is to bias academic research heavily into the direction the companies want. For example, UK universities spend five times as much money on research into oil and gas as into renewable energy sources. Yet you would expect that the latter, being a new field, would require more academic investment than does a mature technology.

The government expects research establishments to attract outside funding, but this makes it difficult for any laboratory such as the Centre for Coastal Research, whose function is largely to monitor the effects of pollution. Corporations are unlikely to fund an institution whose job it is to study the harmful effects of corporations. Monbiot pointed out that the one pollutant that seems to be studied extensively is radon, which happens to be almost the only one that occurs naturally and not as a by-product of industry or agriculture.

In the same way, a disproportionate amount of public money has gone into research in agricultural and biomedical biotechnology. Research into the risks of genetic engineering, which ought to have been high on the agenda of public funding councils, is almost non-existent. Instead, as in the case of Dr. Arpad Pusztai, whose scientific findings go against the interest of corporations, he is sacked and villified.

Monbiot ended by charging that scientists tend to side with the corporations and not with the public. "We need a revolution in the laboratory", he said, though he didn't say how we could go about it. When asked how an independent scientist could work for the public good, all he could advise was to set up shop independently, like the staff of the Centre for Ecology, who were driven out of Edinburgh University for criticising the government and industry.

There were lively interjections from the floor on issues that were hardly touched upon on the platform, especially those that might begin to solve some of the problems aired. For instance, little, if anything, has been done to promote *critical* public understanding of science by those charged with the task, such as the Royal Society's Committee for the Public Understanding of Science (COPUS), nor have they made any effort to engage the public in open dialogue. A public with critical understanding of science is necessary, both for making democratic decisions on science and science-related policies and in ensuring that science is accountable to society. The suppression of scientific dissent by the scientific establishment must be strenuously resisted by all concerned, as it serves to promote the corporate agenda and threatens to stamp out any effective opposition to the corporate take over from within the scientific community. Above all, scientists need to reject biotech patents and to recapture public funding for scientific research that genuinely serves public good (see "Slaving Science and Society with Public Subsidy", this issue).

Unfortunately, the wider issues never got discussed, as the organizers' concerns seem to be too narrowly focussed on the protection of whistle-blowers. The corporate take over of science needs to be tackled at source, in the structure of governance, in the social responsibility and ethics of science. It is not just the individual freedom of scientists to tell the truth that is at stake, important though that is; it is their independence and their freedom to work for public good that must be restored and maintained.

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Biomed Journals Strike Out for Scientific Independence

The world's top biomedical journals are striking out for scientific independence. In contrast, the universities and learned societies are deathly silent on the issue. Dr. Mae-Wan Ho reports

“Governments, nationally and regionally, have consistently failed to put their people before profit. By contrast, academic institutions could intervene to support scientists when financial conflicts threaten to do harm. But these institutions have become businesses in their own right, seeking to commercialise for themselves research discoveries rather than preserve their independent scholarly status.”

The above passage came from an editorial in *The Lancet* earlier this year [1], which concluded, almost as a counsel of despair, that the science journals could be “one last means of protection” for scientists.

In August, *The Lancet* and other top biomedical journals, including *New England Journal of Medicine*, *Annals of Internal Medicine* and *Journal of the American Medical Association (JAMA)*, announced that they will reserve the right not to publish drug company-sponsored studies “unless the researchers involved are guaranteed scientific independence” [2].

A week later, Britain’s top science journal, *Nature*, said that it will expect all its authors to declare “any competing financial interests” with the research papers they submit. It is unfortunate that *Nature* could not find itself supporting the much stronger position taken by the other biomedical journals. Many journals have required declaration of competing financial interests for years, but that has proven inadequate to counteract the undue influence that drug companies have over research results.

It is hoped that the new, stronger guarantee of scientific independence will give researchers more leverage in their dealings with the pharmaceutical industry.

Scientists who publish in biomedical journals are usually university professors and other experts in the field, but much of the research is paid for, and in large part carried out by companies. Company employees often collect and analyze the data, decide how it should be presented and write the reports.

The journal editors decided to act after several recent high profile cases in which drug companies have been charged for withholding research results or present them in unjustifiably favourable light

Last year, researchers at the Harvard University and the University of California at San Francisco defied a corporate sponsor by publishing a study concluding that its vaccine developed as an HIV therapy, Remune, did not benefit patients who were already receiving standard treatments. The company is seeking \$10 million in compensatory damages.

University of Toronto professor Nancy Olivieri lost her job after she spoke out and published an article in 1998 about a serious side effect of deferiprone, a drug for a blood disorder. Olivieri’s contract with drug company Apotex contained a non-disclosure clause. Similar non-disclosure clauses are routine, and some even adopted by research institutions in Britain.

In the early 1990s, University of California San Francisco *pharma*-cologist Betty J. Dong found that cheaper generic versions of thyroid hormone worked as well as Synthroid, the brand-name drug whose maker had funded the research. The company, Knoll Pharmaceuticals, successfully blocked publication of Dong’s findings for seven years. In 1999, Knoll agreed to pay 37 states almost \$42 million to settle a suit alleging that it had made false claims that Synthroid was superior to competing brands and had interfered with the publication of the study.

Catherine D. DeAngelis, editor of *JAMA*, said her journal already has a policy of demanding that authors vouch for the integrity of their data. “The goal would be that all of the major journals would adopt similar . . . principles,” she said.

Surveys of the medical literature have shown that studies paid for by drug companies are more likely than those with other sponsors to show results favourable to the product tested. Many, though not all, medical schools in the United States include clauses in grant agreements with companies stating that researchers will be free to publish even if the results are negative. But these agreements do not necessarily protect researchers from pressures not to publish for fear of losing future funding.

Bert A. Spilker, senior vice president for scientific and regulatory affairs at the Pharmaceutical Research and Manufacturers of America, called the journal editors’ concerns “patently absurd”, and accused the journals of becoming more and more antithetical to the “industry perspective”.

The biomedical journals striking out for scientific independence is to be applauded. But unless there are other concrete measures to counter the corporate culture in science, there will continue to be self-censorship and failures of disclosure. Worse, there will be temptation for scientists with vested interests to endanger lives.

Related items, “Independent scientists an endangered species”, and “Corporate science kills”, this issue.

1. "The tightening grip of big pharma", Editorial from *THE LANCET*, April 14, 2001.
2. "A stand for scientific independence" by Susan Okie, *Washington Post*, August 15, 2001.

Independent Scientists An Endangered Species

Independent scientists are a dying breed. All over the world, they are suffering persecution from an 'academic-industrial complex' bent on promoting corporate science and technologies that endanger lives and destroy the planet. We desperately need independent scientists if only to protect us from the failures, to anticipate the dangers and to repair the damages done. Dr. Mae-Wan Ho calls on civil society and government to take concrete measures to protect independent scientists, and to support independent science that benefit society as a whole rather than big corporations.

Associate Professor Ted Steele is internationally renowned for pioneering work in the genetics of the immune response, which earned him the label 'neo-Lamarckian'. He has fought many battles against the old guard, who feel so threatened by his work that they have blocked his papers from publication, reviled him in public, and called on a book he published in 1980 to be "burnt". Nevertheless, his idea that individual immune experience can directly alter the genome is supported by his own experiments and by the work of others [1], posing a deep challenge to the genetic determinist paradigm that has promoted genetic engineering biotechnology since the 1970s and still, today, dominates the mainstream. Most of Steele's work was done over the past 16 years while he was a tenured staff member of the University of Wollongong in Australia.

But trouble brewed when the Australian government began to slash funding for research in 1996, in line with all other industrialised countries. This sent university managements into a cut-throat competition for corporate sponsorship. The University of Wollongong has been at the forefront of the drive to turn itself into a business enterprise. Support for Steele's basic research began to dry up. As in universities in other developed countries, staff were often hired not so much on their merit as scientist as entrepreneur, and poor students were taken in for commercial reasons.

For Steele, the last straw came when borderline pass students were upgraded against his recommendation, so that they could qualify for post-graduate funding. He refused to let that happen, and was dismissed without notice by his University's vice chancellor, Prof. Gerald Sutton, in February [2].

In the weeks following, massive support for Steele came from within the University, which soon spread to the rest of Australia and the world at large. The University of Wollongong was served with a Federal Court action by the Australian National Tertiary Education Union (NTEU).

Prominent Australians sent an open letter to condemn the University, and thousands of messages of support came from academics and faculty unions around the world, calling for Steele to be reinstated.

In August, the Federal Court ruled against the University. It found Sutton's dismissal of Ted Steele had breached the conditions of the University's enterprise agreement with staff.

There were calls for Sutton to resign. But the university council met behind closed doors, and afterwards, a short press release was issued stating that [3],

"The council had reaffirmed its commitment to abide by enterprise agreements with its staff. It noted the decision of the Federal Court. And it required Prof Sutton to continue to regularly inform members of the council regarding progress of negotiations between the NTEU and the university."

There was nothing to indicate that Ted Steele is to be reinstated.

Steele, who has not been paid for six months, has had to cash in his superannuation fund and to hire his own lawyer. "I am still in negotiations," Steele says, "The university will reinstate me but I will be immediately retried on the old allegations and a range of new ones. Straight out of a Kafka nightmare."

In fact, the University of Wollongong has appealed the Federal Court decision, which will mean another 6 months at least before there is any hope of a settlement. Steele's Union is finally calling for the University to reinstate Steele and to drop the appeal. But no reaction has been forthcoming from the University so far.

Steele is not an isolated case. The latest victims of corporate persecution are scientists at the top academic institutions in the United States [4]. Dr. Steve Lagakos, Harvard University researcher, was running one of the largest trials of a new AIDS treatment. Three years into the trial, and he realised that the treatment was not working. He ordered a halt.

When Lagakos broke the news to the sponsors, Immune Response Corp., the company executives seemed to have accepted it. But as the months passed, they first suggested, then

insisted, that Lagakos and his collaborator, Dr. James O. Kahn of the University of California, San Francisco, report that its therapeutic vaccine had some effect.

Lagakos and Kahn refused, and published their findings last November. In an unprecedented move, the company filed an arbitration claim seeking up to \$10 million, alleging that the scientists have defamed its product. That product happens to be among an entire genre of AIDS vaccines that have been damned by other scientists for safety reasons (see “AIDS vaccines trials dangerous”, this issue).

The company’s actions may have been unusual, but efforts by industry to manipulate, delay or suppress the findings of university-based research are not [5] (see “Biomedical journals strike out for scientific independence”, this issue). Many academic researchers, unlike Kahn and Lagakos, keep quiet to avoid angering corporate sponsors, according to Drummond Rennie, a medical journal editor who has studied the issue. This is confirmed by surveys carried out in Britain and Australia.

And in far too many cases, it is the academic institution that victimizes those scientists who dare to stand up for independence. Lagakos and Kahn may be among the fortunate few to enjoy institutional support.

In Britain, the Pusztai affair has been widely reported [6,7] and misreported to this day, so perhaps it bears repeating. Dr. Arpad Pusztai, senior scientist of the publicly-funded Rowett Institute, and his collaborators were awarded a 1.6 million pound government grant to carry out systematic safety testing of GM food, which hitherto had never been done. They found that the GM potato lines tested were toxic to young rats, and Pusztai informed the public in a brief interview, which formed part of a TV documentary broadcast in 1998. A few days later, he was sacked from his job, denied access to his data, and forbidden to speak on the subject until an international group of twenty-four scientists spoke up for him six months later. This opened the floodgates of attack and vilification against him and his supporters from *within* the scientific establishment, of which he has been part.

Among the most vociferous critics were government scientists who have been responsible for approving GM foods for the market and also the hitherto most respected and prestigious association of top scientists, the Royal Society. Fellows of the Royal Society accused Pusztai of endangering ‘sound science’ in making public findings which have not been peer-reviewed and published in a scientific journal. An official review was set up by the Royal Society to discredit Pusztai’s work in public.

Pusztai and his collaborator, Dr. Stanley Ewen of Aberdeen University, published part of their findings a year later amid a fresh storm of attack, and even reported threats to the editor of *The Lancet* from a fellow of the Royal Society. There are still no plans to repeat the work, nor serious efforts to support independent scientific research that would throw light on the hazards of GM. On the contrary, the scientific establishment, the government and corporate business have been working seamlessly together to suppress scientific debate and to promote biotechnology [7].

There have been other casualties since. Dr. Susan Bardocz, senior biochemist, was forced to take early retirement because she is Pusztai’s wife and coworker, according to Pusztai; so has Stanley Ewen. Further afield, those scientists within public institutions whose work provided key evidence of horizontal gene transfer, and who have warned of its risks in GM crops, have also lost their grants or their posts.

I, too, was retired early last June. My department has banned ISIS from campus after a traumatic episode [8], even though I have a written contract from the University for a Visiting Readership after the retirement. The contract states that one of my main task is to run ISIS. My name has been removed from the University website, and the department is in the process of hounding me out altogether, by reducing my office space, and especially, laboratory space until it becomes unworkable.

Why are so few scientists speaking out? Is it that the vast majority of them do believe in biotechnology?

A survey on attitudes toward biotechnology among Cornell University agricultural and nutrition-science faculty and extension staff (who advise farmers) found that nearly half have reservations about the health, safety, and environmental impacts of GM crops and doubt they are the answer to global hunger [9]. Only 37% were strong biotech supporters, while 8% thought agricultural biotech might have useful applications and help alleviate global hunger, but were concerned about food safety and inadequate testing.

Though in the minority, the biotech promoters said they felt very comfortable voicing their views in public, in contrast to the concerned majority that did not.

Too few academics are willing to openly criticize biotechnology for fear of retribution from the biotech boosters, says John Ikerd, a retired agricultural economist and biotech skeptic from the University of Missouri.

In his view, the enormous public resources devoted to biotechnology programs are corporate give-aways that come at the expense of other kinds of research, which is exactly what is happening in Europe [10]. Ikerd's own work is on sustainable agriculture systems serving family farms rather than the big agribusiness models that land-grant universities have been promoting for more than 50 years. His research is seen as a threat to corporate agriculture, he says, because it reduces farmers' reliance on agrochemical inputs that the companies sell.

Ikerd's candid remarks don't go down well at his university. "You are not on committees you used to be on, you're not involved in the leadership of the department, and you don't get write-ups in the university publications..." How true!

Over the past year, there have been persistent rumours of staff departing from the John Innes Center, Britain's top GM crop research institute. Those staff members that have been doing sustainable agricultural research or any kind of non-GM research have disappeared. Meanwhile, corporate scientists are outdoing themselves attacking organic agriculture and promoting GM in direct opposition to the wishes of the overwhelming majority of the people. Corporate scientists are rapidly becoming public enemy number one.

When will our academic unions, universities and learned societies follow the lead of the top biomedical journals and take a firm stand against the persecution of independent scientists (see previous report), to support open discussion and debate? When will our government legislate to support and protect scientific independence, and to fund the kind of science that genuinely benefit society as a whole?

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3. "Talks over Steele sacking" by Paul McNerney, *Illawarra Mercury*, Saturday, August 18, 2001.
4. "Standing up to industry" by Douglas M. Birch and Gary Cohn, *Baltimore Sun*, June 26, 2001.
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