

## New Scientist and Greenpeace Science Debates

### Science, technology and our future: the big questions

#### Can Science be directed?

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I think science since it became organised, and it is in the last two hundred years, could not have become an organised enterprise without being directed. It is just that the objectives of direction, the processes of direction are changing. The most important way in which science has been directed has been through funding, the last presentation was clearly showing how what science does, where it goes, what it produces, is very much a function of what money goes into it and since the money happens to be taxpayers money you would imagine that those whose money is being used should have a say about where they would like it to go. That is the external democracy context of science but there is a second reason why we need a widening of the circle of participation in science and that has to do with the fact that increasingly the new sciences are creating impacts which are borne by the larger public, whether they be in the form of environmental impact, social impact, health impact. And those who carry the burden of the impact also need to have a say whether they want that impact or not. They are part of the enterprise by the very definition of the impact.

There are other ways in which science is being directed. It is being directed in terms of content. We should not forget that so much of the science that evolved in the grand institutions, like the one in which we stand, redefined what science was in a very dramatic way. They did not just redefine what a scientist was. They redefined dramatically what would be counted as knowledge, what would be counted as unscientific - and the sciences of ancient knowledge cultures like China like India were just put into the non-science category. Today large numbers of people in the world are turning to Chinese medicine, are turning to Ayurveda and yet we have had two hundred years of non-funding of these tremendous systems of knowledge. They have survived in spite of no attention which tells us something about their resilience. Choices were made to give a preference to allopathy. World-wide decisions were made that chemical agriculture would be the way agriculture would be done and now decisions are being made that agriculture based on genetic engineering is the way agriculture should go. I see the recent speech of Tony Blair as very much a direction of science. It so happens that Mr Blair ended up justifying his speech and its inspiration from my country. He actually said that the idea of making the speech "has been in my mind for some time and the final prompt came for it curiously enough when I was in Bangalore in January".

"I met a group of academics, who were also in business in the biotech field. They said to me bluntly: Europe has gone soft on science; we are going to leapfrog you and you will miss out. They regarded the debate on GM here and elsewhere in Europe as utterly astonishing. They saw us as completely overrun by protestors and pressure groups who used emotion to drive out reason. And they didn't think we had the political will to stand up for proper science."

Frankly no Indian speaks that language even if you are in the biotech industry. Somewhere in the middle the PR firm entered. The interesting point about the institutions of Bangalore because I am a product of those institutions, I have

taught in those institutions especially the Institute of Science. I have worked with scientists at the Agriculture University two leading institutions that are getting impacted by a new direction of science and the new direction of science is the commercialisation of science. Monsanto has a \$30 m lab harvesting the best work in Indian molecular biology by entering the Institute of Science. I know scientists who have questioned that collaboration who have wanted--we have had debates, we have had public debates, we have had protests, we have had students sitting on the lawns wanting that agreement between the Institute of Science and Monsanto made public. Very basic democratic demand - it is still secret for five years after Monsanto entered. About four months ago, just a little before Mr Blair would have visited, and I'm sure he could not have missed the news on it, the agriculture campus grounds were given away for a new biotechnology park and the agriculture students said "this is public property - it has to be used for the public good; we need far more attention for organic agriculture, sustainable agriculture that has been neglected all these years". They sat in protest. They were arrested, they were beaten. So it isn't the case that UK has a special protest tendency. Irresponsibly introduced biotech has a habit of generating protests wherever it goes and I think that really is the issue we face today about the challenge about the direction of science. That science is being directed but it being directed by invisible actors and it is interesting that not once in this big speech of Mr Blair did the real actors on whose behalf he is speaking get mentioned. It's been narrowed down, and in any case in the last two hundred years science has not had the capacity to open itself to public scrutiny and public accountability even though it has been a public enterprise and still has massive public subsidies. Yet the privatisation of science is going to destroy what little fragile internal democracy science has. It didn't have external democracy but at least you could go and present your paper and your colleagues would either trash it or cite it 500 times. If you had fake data you would be torn down by your peer review. In the last decade of research on the cutting edge discipline of genetic engineering there is no peer review. And any time a scientist has dared to do independent research in an honest way as part of a member of the scientific community they have been sacrificed. We have just have to look at just cases of brilliant scientists with

the most brilliant work, Pusztaï in this country and Chapella in Berkeley. For doing science has become dangerous, science is being misdirected into non-science and I think that is the crisis we face and that is the crisis Mr Blair is not just evading but he is covering up. He actually says that the protestors are blocking science because you must let, he talks about the difference between facts and judgements and then he goes on to talk about the fact that "there is only a small band of people who genuinely want to stifle informed debate but a small group as has happened in our country destroy experimental crops before we can determine their environmental impacts. I don't know what that research would have concluded, neither do the protestors but I want to reach my judgements after I have my facts and not before". There is so much garbage in that paragraph. Very rapidly: you don't need to do releases and experimental field tests to be able to understand the emergence of super pests and super-weeds through the transfer of genes, these are done through models, done through non-GM crops through pollination transfer. Every one of the questions he says the facts that he is waiting for from deliberate release are facts that good science can give and should give through ecology, through good modelling. But the most important issue is that he talks constantly about science giving us the facts as though science is a mastic who gets up and speaks. But science is an amazingly complex pluralistic community of actors and those different voices are saying different things within science today, and to stifle the fact that there is a debate internal to science about the public future of science, its direction and accountability, and to make it look like a band of protestors was this magnificent enterprise is precisely what is being massacred in this new direction. I was reading New Scientist and I want to end with this. Amartya Sen talks about how economics needs to be modelled on science and that science is based on give and take. He talks about an old Bengali saying that knowledge is a very special commodity; that the more you give the more you have. Science broadly speaking is the cultivation of that giving. You can't have science without sharing knowledge. The second crisis of the new direction of science is that you are getting efficient systems to harvest public science and the results of public science but no thought has been applied to how will the give and take that makes knowledge grow continue in the future.

Take patenting, take IPR, take the shutting down of conversations between colleagues who are worried about their contracts with Monsanto and you have got a system in which you are actually, if we don't have a bigger debate on science, you are going to see the end of science and I think that is the real challenge.