

## **The Science Communication Conference 24th - 25th May 2004**

### **Session 4: political realities**

#### **Professor Brian Wynne, Lancaster University, Public dialogues with science: some complications from the case of nanotechnology**

I've been given the topic of nanotechnology to discuss in this session, along with Jacquie and Judith. We could have swapped around on topics because each of us has been involved in work on these three different substantive arenas. Today I will make more general points about public dialogue and public engagement with science, through the eye of the nano-needle, if you like, and conclude with broader observations.

An important point about nanotechnology is that nobody can precisely define it. The Royal Society's working party is about to issue a report which will be quite a landmark report on this issue and also will include the public and social dimensions and regulatory issues and so on. It pays attention to nano-science and nanotechnology being a huge array of different kinds of things, many of which are simply as yet in laboratories in the imaginations of scientists and not very much at all out on the streets as it were as technologies in society. That gives us interesting opportunities and also interesting challenges in terms of trying to understand and anticipate public responses and in trying to work out how one might shape sciences and technologies in this domain in many ways that might correspond better with public priorities, concerns and so on.

I want to begin though with something which is very familiar - the public deficit model. It has an assumption about the world into which sciences and technologies emerge and have to make their way. The public deficit model has been abandoned many times, but it's also been reinvented several times too. I think its worth reflecting on this because it does indicate something about the institutional culture which has occurred particularly since the House of Lords Report in 2000 on Science in Society.

I have a list of a few of the reinventions which have occurred [see powerpoint presentation]. I would like to point out the different types of 'uncertainty' [see powerpoint presentation]. Risk and uncertainty, which I might loosely identify as known uncertainty, is when we can attach probabilities to them. Ignorance, which is about the unpredictable consequences, is when we don't even know what the right questions are to be asking, and I want to emphasise that's a predicament. It's not a reflection of bad science. It may be – for example inattentive or negligence science that isn't looking in the right places. But it is always a predicament as there is always going to be unpredictable consequences because of the sheer complexity of the world.

I want to draw your attention to that because its relevant to nanotech and the typical dominant reflex approaches to how we deal with an emergent

technology and the social responsibilities of assessment response, policy, regulation and so on, and particularly the public responses issue on that. One example of a version of the reinvention of the deficit model is this excerpt [see powerpoint presentation] from a lecture by Bob May, then Government Chief Scientist, now President of the Royal Society of course. He's asserting that public mistrust is actually generated by public misunderstanding of scientific process as distinct from the earlier version which is about public misunderstanding of scientific content, such as the physics of nanoparticles or the genetics of non-GM tomatoes as well as GM tomatoes.

The deficit model has gone through various versions since the early 90s to the present time, and I still think we are operating in a culture where it's almost as if a deficit model of the public is actually required. That is a very interesting and important phenomenon with respect to understanding the institutional culture which constructs and projects models of the public into the public domain as representations of those publics, even whilst we are actually attempting to listen to and understand those publics.

There's a reverse process going on that we need to recognise which is our assumptions being constructed about the public and imposed on them. Very often I think what we are actually finding in public responses is actually public responses to those projections. This is a quote [see powerpoint presentation] from a philosopher John Dewey, indicating the point about projection of assumed models of the public, and interestingly enough this was written in 1927, so this problem has been around for a while.

Of course there is public ignorance of science, but there's also scientific ignorance. We all suffer deficits of understanding. So of course there is public ignorance of science, but is that because of the kinds of problems that people define in terms of public refusal or scepticism or mistrust? I think that's a much more problematic kind of belief which exists in our institutions of policy and science. I don't think it's fair to say that as a general matter public ignorance is the cause of public anxiety or public mistrust of science, despite the fact that there is plenty of public ignorance there.

And I think it's true that scientific denial of scientific ignorance is a key factor in public mistrust. Now what do I mean by scientific denial of scientific ignorance? The emphasis on risk and risk communication, and the same is true so far at least in the early days of the nanotech debate. Now of course we want to try and understand as best we can what the risks are - how they are likely to be delivered and so on - but there's always a concern which goes beyond that. It's true of the GM debate, and it's been shown in the research on public attitudes, that people are concerned about questions beyond those which risk assessment can address. They are concerned about unpredictable requests, and risk assessment by definition can't deal with those. This is a predicament, it's not bad science - just a predicament. The point is that public experience of that discourse which is *the* dominant institutional

discourse and it's going to be for the nanotech debate as well. I'll bet my shirt on it, the public experience of that discourse sincerely and competently reproduced is institutional denial. In effect its institutional denial of the unpredictable effects.

So science is exaggerating its own degree of control over the consequences of these kinds of technology. That's a bit of a problem that we need to reflect upon as the institutional actors doing the science and representing it in public domains, and I'd include there media colleagues and friends who are communicating science. You've got to find ways of representing and addressing these further concerns. Now we can argue about whether those are a scientific responsibility or whether they are a policy responsibility. I think it's a very ambiguous issue and its something for which we need to take responsibility collectively and try and work out how we are going to handle it. And if we want to ask what is causing public mistrust and scepticism let's ask some questions about this phenomena and this problem which is a question about the institutional culture.

So the risk discourse is inadequate primarily because it effectively denies the existence of unpredictable effects and the inability by definition of science to be able to control those intellectually and predict them.

Nanotechnology more than any other I think can't be contained by prediction. George Smith, head of material science at Oxford, talks about gold and silver, which are normally very inert metals (that's why they are so valuable because they don't actually disappear with corrosion and so on) but at the nano scale gold acts as a highly effective catalyst and silver displays bio-active properties. To quote George Smith 'there is still no such satisfactory explanation for the observed behaviour of either of these materials in nano-particle form and no sure way to predict how other materials may behave when dispersed in the same size range', at nano-scale.

We get completely different properties at that sort of scale, and yet existing regulatory in risk assessment frameworks doesn't distinguish between ultra-fine particles and nano-particles. A bit of a question there. And as George Smith indicates the predictability issue is well recognised by many nano scientists, who are perfectly open about it. Predictability is a bit of a problem if that's what our assessment processes and the means of actually encompassing public responses. We need to start re-thinking from the ground up how we're going to deal with that and how we're going to deal with the public dimensions of that too.

Now, I would suggest the first thing to do is to be honest about it. It's usually not a bad starting point for trying to work on public trust. So, nearly all of the public engagement processes that we've seen so far often very well designed, well conducted (well resourced we might want to argue about) but they've all been focussed on the back end only on consequences and risks. This just reinforces the problems that I've been indicating as people's concerns about new technologies like nano and bio, are about the

unpredicted effects and the unpredictable effects which risk assessment doesn't cover. Also as a perfectly logical response to that recognition, people are also asking questions about 'so what are the driving purposes that are actually shaping these sciences and technologies upstream? Who is in charge of this? What kinds of visions, assumptions, imaginations are actually influential in shaping those sciences further upstream in the lifecycle?' A perfectly logical kind of question, if you know there are going to be unpredictable consequences. So that's where the issue of trust arises and who is in charge of responding to unpredictable consequences? What kind of motivations and interest are going to be driving them?

Those questions about trust are a logical consequence of the recognition that ignorance is a predicament that's always there stalking us. And it shifts the focus of engagement issues to the more upstream end of the process of science and what we need to be doing is trying to encourage scientists in those processes to be more articulate about the kinds of assumptions and visions and imaginations that are inspiring their research in laboratories, and from that to render those more accountable, more open to dialogue and engagement with a whole variety of different stakeholders, interests of whatever kind, user groups and so on.

Now what that doesn't mean is inviting the public to stand at the laboratory door and have votes on what the scientist does next in the laboratory, which is often the caricature of upstream public engagement. It means encouraging scientists to put their visions into the open, to be more articulate, to have more self-reflection about where their assumptions have come from and then trying to render those more accountable, more realistic, more responsive to societal priorities and concerns. And I think that's true not only in the nanotech domain, but also in those other domains of science and technology that concern us. It's only through developing that kind of process that we will be able to generate a robust and quality kind of science that will be sustainable. Thank you.