metric tons, is applied to Rhenium with 45 mt. Three years into the process and we still do not know how much the exercise will eventually cost. The lawyers who run the consortia, according to EU rules, tell us that once registered we shall recoup our cost from other importers who will have to purchase a 'letter of access' to acquire the information we have created, the price of which will be determined by the amount that the consortia have already spent divided by the numbers of those requiring access. In practice, though, the machinery of registration, evaluation and authorisation is a steam-roller with no reverse gear and we do not expect funding to be returned to us; which is more likely to be gobbled up in the maintenance and reparation of the steam-roller.

Over the last two years, we have moved towards implementation, and industry has been swept into the process, dedicating vast amounts of time and money to compliance. We have seen decisions about investment abandoned and plant, equipment and processes hurried overseas to locations where neither the laws nor the controls are as great.

The great irony is that elements are not good or bad, they are substances with sometimes conflicting properties and uses. One of the best examples is Thallium. Used as rat poison by the Victorians, a few milligrams is enough to kill the human organism. And yet Thallium has a unique co-efficient of diffraction and, today, when doped in glass, is essential in fibre-optic repeaters to boost light signals. It is also used entirely safely in digital camera lenses and photocopier glass. But Thallium comes from lead and zinc ores and is refined out as a by-product on the route to making pure 99.9% Lead and Zinc. The problem for Thallium is that no consortia exists to register it under REACH. The cost would simply be too great. The puritanical zeal of the law, which effectively classifies elements not for their scientific and chemical properties but because of their moral worth to the environment, is shutting out the production of Thallium in Europe for ever, as well as any prospect of its further use. What will happen to the Thallium atoms you may ask? They will most likely go to landfill.

The problem for any business advocate of the removal of a piece of environmental legislation is that current orthodoxy means it is doomed to failure. However, as the EU Chemical Directive rolls out, and the EU slowly becomes a clean room, Europe is also becoming cleaned of manufacturing and innovation. The hypocrisy is that we remain content to import articles from other parts of the world made under circumstances and conditions which are far inferior to those being implemented under REACH. The net effect is the export of both jobs and morals. It is truly a dark age we are entering.

SCIENCE AND CITIZENSHIP

The Rt Hon the Lord Jenkin of Roding

Opening speech at Science and Citizenship conference held by the British Council at the Wellcome Collection Conference centre on 14th and 15th December 2010 to mark the Tenth Anniversary of the "Science and Society" Report of the House of Lords Select Committee on Science and Technology.

When the British Council invited me to open this important international conference – an event intended to mark the tenth anniversary of the House of Lords Select Committee on Science and Technology's Report "Science and Society" – I did not at first realise the full implications of what I would be taking on. The presence here today of so many delegates from countries outside the United Kingdom brings it home to everyone just how important across the world it has become to find ways to engage the public with science. Indeed, though I and my colleagues hoped that our Report might be useful, I certainly did not begin to realise that its influence would reach across the world. I believe the British Council is to be warmly congratulated on mounting this event and I am delighted to see so many visitors here in the hall.

My task has been described as "setting the scene". Perhaps I might start by briefly describing how the House of Lords Select Committee on Science and Technology works, how the subject of our Report came to be chosen, and how I – someone who never did any science at all at school or university – came to be invited to chair it.

Over recent years both Houses of Parliament in the UK have found that one of the most effective ways to hold Ministers to account, and to explore policy issues more deeply than can be done in debates on the Floor of the House, was to establish specialist Select Committees; the House of Lords set up the Science and Technology Committee nearly 30 years ago, and since then it has established itself as an authoritative and respected body whose Reports are widely studied and in many cases acted upon.

The House of Lords is fortunate in having among its Members scientists and engineers of great distinction, as well as Peers who are expert in other branches of learning and of course people who have held high office in previous governments. When selecting Members to sit on the Science and Technology Committee, the House has a rich store of experience and expertise on which to draw. The Select Committee is free to choose its

own programme of inquiries and this takes full account of current issues and developments in science and technology both in the UK and abroad.

Having chosen a subject, the inquiry then issues a call for evidence and this is then responded to by written evidence from the professions, academia, public bodies, industry, and interested non-government organisations. The Committee then identifies some of these who will be asked to give oral evidence to the Committee where they may be questioned by Members. The Committee may invite evidence from overseas and, in appropriate inquiries, will travel overseas to find out if we can learn from the experience of other countries.

After a Report is published, there are two more stages. First, the Government has to reply to the Report in not less than two months. Then there is a debate on the floor of the House in which any Peer is free to take part – and it is not unusual to listen to views which may either contradict the recommendations in the Report, or, more often, which roundly criticise the inadequacy of the Government's response!

I have no doubt that legislatures in other democratic countries could point to similar procedures.

Mr Chairman, that is how we work and that is exactly how the inquiry "Science and Society" worked ten years ago.

So how did we come to choose this subject? In the UK there had been for several decades an activity which was called "the public understanding of science". Despite the best efforts of many able and committed people in science and engineering, there was a growing perception that this was not succeeding in bridging the gulf between the world of science and technology on the one hand and the mass of the people on the other. So when at one of the Committee meetings I attended we were asked to suggest possible topics for future inquiries, tentatively – because I was a relatively new Member of the Committee – I suggested that we might look at the whole question of the gulf between science and the public.

We had recently had some quite serious scientific crises including a highly damaging outbreak of foot and mouth disease; there had been the alarm surrounding the new version of Kreutzfeld/Jacob disease, there was growing controversy over genetically modified foods; and a great deal of misunderstanding about the drivers of climate change.

You may be surprised to learn that I was rebuffed! Several of the very distinguished scientists who had been involved in the "public understanding of science" loftily told me that this was already in hand and did not need another inquiry. So I subsided!

However, the subject did not go away. The issues became ever more significant, and so late one evening I was approached by the then Chairman, Lord Winston, who invited me to chair an inquiry on "Science and the Public". Of course I accepted. We then had a meeting of the Committee where this was proposed, but one of the young advisors to the Committee suggested that, instead of "Science and the Public" perhaps "Science and Society" would have a better ring about it – and it was so decided. We then got to work.

Why was I invited to chair it? For that you must ask others; as I have said I was no scientist but I had held Office in the Cabinets of two successive Conservative Governments and had a good deal of experience as to how government worked.

Our first task was to appoint Special Advisors. In an earlier inquiry, about the handling of nuclear waste in which I had taken part, I had been hugely impressed by an academic from Lancaster University, Professor Brian Wynne, who had offered us much wisdom about how to approach the public on such matters. So he was my first choice and I might add that it is sad that he is unable through illness to take part with us today. Our second Advisor was your next speaker, Professor John Durant, then a professor of the Public Understanding of Science and a distinguished academic at Imperial College London.

After taking advice from these Advisors and from the Committee staff, we issued our call for evidence in April 1999. This set out the questions that we wished to examine, the first of which was "What is known about the attitudes in UK society towards developments in science? What is known about the levels of trust in scientists? Are some groups of scientists trusted more than others and, if so, why?" And there were a number of questions elaborating on that central theme. We made it clear we were not concerned about the education and training of specialist scientists, nor were we seeking to encourage more people to follow science careers. Important as these subjects are, they were already under examination elsewhere.

I was astonished by both the volume and the erudition of the huge mass of written evidence we received. We had certainly found a topic of very wide concern. It is the practice of these Committees to publish the evidence. My friends, here is the published document! It is still in print and available from the Stationery Office – all 426 pages of it!

Based on that evidence, we invited a long list of witnesses to give us oral evidence, when we could examine them in more detail, and between May and December 1999 many dozens of witnesses of widely different opinions and expertise were examined. This oral testimony is included in the volume.

But that was not all. I and a few others visited the US in October 1999. There our programme included meetings with the White House Office of Science and Technology Policy, the National Academy of Sciences, The National Institutes of Health, the National Science Foundation, the Boston Museum of Science, and the Kennedy School of Government at Harvard University. These and other meetings in America had a considerable influence on our recommendations; it was clear that in the United States they faced many of the problems which we did.

After we had completed our hearings and studied the evidence, the Committee then held a series of drafting meetings.

The first draft was provided by our very able Clerk to the Committee – but, my friends, that was only a first draft! With the advice of our Special Advisors and with the wisdom of our really eminent scientists on the Committee, we went through the draft paragraph by paragraph and made numerous improvements and alterations. Indeed, for some sections we produced entirely new drafts

Eventually we finalised our draft and it went to the printers and was published on February 23rd 2000. We made twenty-six

recommendations lettered, conveniently, A-Z. These are all set out in the Summary at the front of the Report and I will not weary you by reading them all out. I can give what I hope is a useful summary.

Turning first to public attitudes, we recognised that people now question all authority including scientific authority; the age of deference is long past! People place more trust in science which is seen as "independent"; secrecy invites suspicion; what seem to be scientific issues in fact involve moral, social, ethical and other concerns and, if these are not recognised, that invites hostility. There is a widespread misunderstanding of risk; and it has to be recognised that underlying people's attitudes are the values which they espouse.

So, our central recommendation was that the crisis of trust which I have described has produced what we called "a new mood for dialogue". It is not only public understanding that is important, scientists must understand the impact of science on society and on public opinion.

We also recognised that scientists must be free to pursue the lines of research they choose, and we discussed how and when the public should be made aware of their work.

So, I come to our principal recommendation. Instead of seeking "the public understanding of science", which we were told very firmly was one-way, top-down, condescending, even demeaning, we recommended a culture of public engagement, and that, my friends, is what lies at the heart of our Report. Engagement must be a two-way process, and, as one of our American witnesses put it eloquently, it requires "ears as well as voices".

We went on to say that all this requires genuine changes in the cultures and constitutions of key decision-making institutions. Public support for science is essential if progress is to be made. The concept that scientists have a licence to practise from the public has to be clearly recognised.

We also had recommendations about science and the media, about science education and schools and time does not allow me to outline them here today; they are there for the reading in the Report.

And what was the outcome? For about a year, there was little response. The reason for this was that the Report was thorough, detailed, and complex and the recommendations had many far reaching implications. Eventually, however, the messages were taken on board. What had hitherto been the one-way process of the public understanding of science gradually gave way to public engagement. One by one all the principal UK scientific and engineering bodies established their "science and society committees" (though they were often under different names).

After a further delay, the Government recognised that they too had to respond to the Report, not just formally which Governments have to do, but by picking up those recommendations made to Government and acting on them. There is now a fully fledged Science in Society activity within Government and Ministers in successive Governments have urged all the departments and bodies for which they are responsible to take full account of the Committee's recommendations.

It must of course be for those who are to follow me today and tomorrow to describe and evaluate what has happened since then. One shortcoming in our Report of which I was quickly made aware is that while we described a large number of different mechanisms and processes by which scientists interact with the public, we did not succeed in defining what we really meant by "engagement". As a result, many scientists have found it very difficult to know what it is that they might actually do to "engage" with the public.

Another problem, at least until recently, is that the communication of science has tended to rank well below research as a worthy activity of someone pursuing a career in science.

I come finally to my last point – it concerns the relatively new field of Synthetic Biology.

When the distinguished American molecular biologist and entrepreneur, Craig Venter, claimed earlier this year to have created the world's first synthetic life form, and said that this success "has changed his view of life and of how life works", his discovery was greeted in the Times here in London with the headline, quoting an eminent UK scientist, "Synthetic life? Synthetic hysteria more like!"

Yet, of course, the science of synthetic biology (or synthetic engineering as it is sometime called) has immense potentialities as well as some intense moral, ethical and social implications – and it is not going to go away!

Two of the leading Research Councils in the UK launched what they called a "Synthetic Biology Dialogue" – have we not heard that word a few moments ago? – involving a series of public workshops and stakeholder interviews on the science and the moral and ethical issues surrounding synthetic biology. Their Report, 90 pages long, is a really fascinating document and is well worth reading; in the few minutes I have left I cannot possibly do justice to it. One key finding is that it is simply not possible to ask the lay public for their views on the moral and ethical implications, unless they understand enough about the science to know what it is that they are being asked about. I am told that much of the time and effort that went into this exercise was spent on doing just that, before exploring attitudes and reactions. This clearly means that instant polling via Facebook or Twitter or any of the other social websites is not only meaningless, but could well be really misleading.

For me, this very recent report has an additional attraction: it revisits a great many of the concepts and issues which were at the heart of the "Science and Society" Report 10 years ago. It asks many of the same questions that we were asking then.

One distinguished scientist said to me that our Report was perhaps the most influential House of Lords Select Committee Report over the previous decade. I have never written an autobiography and I do not intend to do so. But I have sometimes said to my friends that if I ever merit a footnote in history, it might be for our "Science and Society" Report.