

HOUSE OF REPRESENTATIVES

STANDING COMMITTEE ON INDUSTRY, SCIENCE AND TECHNOLOGY

Reference: Effects on research and development of certain public policy reforms

MELBOURNE

Thursday, 19 February 1998

OFFICIAL HANSARD REPORT

CANBERRA

HOUSE OF REPRESENTATIVES
STANDING COMMITTEE ON INDUSTRY, SCIENCE AND TECHNOLOGY

Members:

Mr Bruce Reid (Chair)

Mr Beddall (Deputy Chair)

Mrs Bailey	Mrs Johnston
Mr Martyn Evans	Mr Allan Morris
Mr Richard Evans	Mr Nugent
Mr Forrest	Mr O'Connor
Ms Gambaro	Mr Zammit
Mr Jenkins	

The committee will inquire into and report on the effect of public policy changes, over the last ten years, in the areas of corporatisation, privatisation, outsourcing and competition policy reform on the matters listed below:

the amount of R&D being carried out in Australia;

the nature of the R&D being undertaken (that is, basic or applied);

the relevance of the R&D to the commercial needs of industry;

the level of investment in research infrastructure and equipment;

the scientific and technological skills base and the demand for scientists, technologists and engineers; and

the education and training opportunities for future research staff.

CONDITION OF DISTRIBUTION

This is an uncorrected proof of evidence taken before the committee. It is made available under the condition that it is recognised as such.

WITNESSES

BROWN, Dr Gordon Gibson, Executive Officer, Australian Academy of Technological Sciences and Engineering, Ian McLennan House, 197 Royal Parade, Parkville, Victoria 3052	11
BROWNSCOMBE, Mr David, General Manager, Commercial Research and Technology Development, Rio Tinto Ltd, 55 Collins Street, Melbourne, Victoria 3000	23
CAMPBELL, Mr Ross William, Director, Government Business and Regulation Section, National Competition Council, GPO Box 250B, Melbourne, Victoria 3001	2
DAVIES, Mr Richard Anthony Hartley, Chief Executive Officer, Australian Minerals Industries Research Association Ltd., Level 9, 128 Exhibition Street, Melbourne, Victoria 3000	29
EAGER, Mr Michael Andrew, Senior Vice Chairman of Council, Australian Minerals Industries Research Association Ltd., Level 9, 128 Exhibition Street, Melbourne, Victoria 3000	29
LAVER, Mr Peter John, Fellow, Australian Academy of Technological Sciences and Engineering, Ian McLennan House, 197 Royal Parade, Parkville, Victoria 3052	11
NOSSAL, Sir Gustav, President, Australian Academy of Science, GPO Box 783, Canberra City, Australian Capital Territory 2601	36
WILLETT, Mr Ed, Executive Director, National Competition Council, Level 12, Lonsdale Street, Melbourne, Victoria 3000	2

HOUSE OF REPRESENTATIVES
STANDING COMMITTEE ON INDUSTRY, SCIENCE AND TECHNOLOGY

Effects on research and development of certain public policy reform

MELBOURNE

Thursday, 19 February 1998

Present

Mr Reid (Chair)

Mr Beddall

Mr O'Connor

Ms Gambaro

Mr Richard Evans

The committee met at 9.29 a.m.

Mr Reid took the chair.

CAMPBELL, Mr Ross William, Director, Government Business and Regulation Section, National Competition Council, GPO Box 250B, Melbourne, Victoria 3001

WILLETT, Mr Ed, Executive Director, National Competition Council, Level 12, Lonsdale Street, Melbourne, Victoria 3000

CHAIR—I declare open this first public hearing of the inquiry into the effects on research and development of public policy reform. I welcome witnesses Mr Ed Willett and Mr Ross Campbell and others in attendance. We will be taking evidence today from the National Competition Council, the Australian Academy of Technological Sciences and Engineering, Rio Tinto, the Australian Mineral Industries Research Association and the Australian Academy of Science. Later today the committee will be inspecting the Telstra Research Laboratories in Clayton.

The purpose of this inquiry is to identify the effects on R&D of corporatisation, privatisation, outsourcing and competition policy reforms which, over the past 10 years, have affected nearly every area of Commonwealth and state government service delivery. The changes may well affect the R&D being conducted not only in the public sector but also in the private sector. The effects may be intentional or unintentional, beneficial or undesirable. We intend to assess the impact of those policy changes.

Before I call the National Competition Council to give evidence, I would like to introduce the members of the committee—on my right, the Deputy Chairman, the Hon. David Beddall, Mr Richard Evans, Mr Gavin O'Connor and Mrs Therese Gambaro. Our secretary is Mr Russell Chafer, who you have no doubt had contact with.

Resolved (on motion by **Mr Beddall**):

That the committee receive as evidence and authorise publication of the submission from the Australian Academy of Technological Sciences and Engineering.

I now call on Mr Ed Willett from the National Competition Council to give evidence to the committee. I do not know whether you would like to make an opening statement. I welcome you and remind you that all the proceedings here today are legal proceedings of the parliament and warrant the same respect as proceedings in the House. The deliberate misleading of the committee may be regarded as a contempt of the parliament. The committee prefers that all evidence be given in public, but should you at any stage wish to give evidence in private, you may ask to do so and the committee will give consideration to your request.

Mr Willett—I thought I would make some very brief comments about national competition policy reform and the role of the council and then take questions on the more specific areas of interest to this review. National competition policy comprises a series of agreements entered into by all state, territory and Commonwealth governments in 1995. Those agreements comprised general competition policy reform agreements and picked up

some existing specific agreements in the areas of electricity, gas, water and road transport.

The general agreements on competition policy reform, in turn, picked up the six elements of competition policy identified by the Hilmer review. Those six areas are an extension of the Trade Practices Act to all businesses in Australia and a review of all legislative restrictions on competition to test whether they are in the public interest and introduction of appropriate reforms. The introduction of a new part in the Trade Practices Act on access to a central infrastructure service is basically a new mechanism for the regulation of natural monopoly infrastructure services and then three areas of specific reforms for government business enterprises in the areas of competitive neutrality, the structural reform of public monopolies and prices oversight, where appropriate, of public monopolies.

The council was established under the reform agreements to perform a number of roles and to broadly act as national champion for competition policy reform and to help lead the reform process in the context of Australia's federal system of government. Specifically, the roles of the council are to make assessments on three occasions of state and territory performance against the agreed reform obligations for the purpose of recommendations on the agreed transfers from the Commonwealth to the states and territories under the agreements if those reform obligations are met. The council makes those assessments on three occasions. The first has already been concluded; it was made prior to 1 July 1997. There are still some outstanding issues in the context of that assessment, which the Council will address by 1 July this year. Then the council will make two further assessments by 1 July 1999 and by 1 July 2001.

In that context, I should say that it is not a matter for the council simply to sit back and wait until the assessment time and then make some judgments. We are fairly heavily involved in the reform process and particularly involved in areas of reform such as gas, water and the more general reforms in legislation review and the introduction of competitive neutrality.

The council also has legislative responsibilities under the national access regime in the new part of the Trade Practices Act, part IIIA. In addition, it is available to conduct work for governments by agreement to further the competition policy reform process. The first item on our work program was the review of Australia Post under the national competition policy reforms. That review is about to be concluded; the report is about to be forwarded to the Treasurer.

It is true that I think you have identified that the reforms in the area of competitive neutrality and resulting corporatisation of GBEs, where appropriate, is perhaps the main focus of competition policy reform that is relevant to your work. But it is also true to say that there are lessons to be drawn and there are implications from the whole competition policy reform process across the board that I propose to draw on in dealing with any questions you have. There is some difficulty in doing that in relation to post. I can only do

that in general terms given the report is yet to be forwarded.

CHAIR—Did Mr Campbell wish to make any comment?

Mr Campbell—Not at this stage.

CHAIR—The committee well understands your position with respect to Australia Post. We also appreciate that research and development is not your responsibility. But I wonder if you might have a view on whether privatisation and competition should encourage a more relevant direction towards the commercial needs of industry. This was a comment made in some of the evidence we have received.

Mr Willett—I think there are a number of points I can make in response to that question. The first thing I would like to say is that, like competition, research and development is not a good in itself; it is a means to an end. Like competition, introduction or promotion of it needs to be considered in the light of the public interest. We need to always bear in mind what we are trying to achieve here—and what we are trying to achieve is to maximise the community interest.

Just in terms of introduction of competition, I think consideration of what the appropriate level and direction of R&D resources and funding should be a question addressed from the point of view of the community interest and the implications economy wide rather than simply saying R&D might be reduced here and therefore that is a bad thing. We can agree that generally R&D expenditure just like competition is a good thing, but that is not always going to be the case in every instance. So we need to think about where the community interest lies.

A lot of competition policy, particularly where it relates specifically to public enterprises, does involve the focusing of public businesses on commercial objectives. That can have consequences for the types of activities that those businesses conduct. That may also mean that consideration needs to be given to activities that may be seen as being in the public interest which those organisations have conducted in the past but which organisations do not have the commercial incentives to conduct in the same way in the public interest in the future.

It is a worthwhile exercise in principle—and the work that the council has been involved in in the competition policy reform process has confirmed that it is a worthwhile exercise—to identify those areas of activity that have a broader public interest component but that may not have full commercial incentives for organisations to conduct. It is a worthwhile exercise to go through and identify those and ensure that they are conducted and appropriately funded.

CHAIR—Now that you have touched on that topic, we have had a view put forward by Professor Stocker noting that privatisation and competition policy raises

questions about what happens to the long-term research for the good interest of the public. Do you have a view on the likely impacts of that following some of the privatisation of competition policies that are being introduced?

Mr Willett—It is a matter of policy—identifying where those broader interests lie and how they are going to be dealt with. I should add that I do not think it is always the case that competition policy reforms broadly are going to push consideration of these issues more towards a shorter term and less towards a longer term. Take, for example, the package of water reforms which have as their very objective a longer term focus and the consideration of issues that are going to have serious implications for Australia in the longer term rather than the shorter term. What we are talking about in the water reform agreements is broadly ensuring that arrangements are in place to promote the interests of efficient water consumption, efficient pricing, the incentives to consuming water at the right levels and ensuring that the environment as a consumer is taken into account.

So, yes, there are some issues that arise in terms of the corporatisation, commercialisation and privatisation process about what activities should be identified and funded in the public interest broadly. But we need to be careful in assuming that this competition policy reform process is always going to push things in that direction. I do not think that is always going to be true.

I do think, generally, the identification of those public interest areas, whether they involve spillover effects or public good characteristics, the identification and funding of them where it is appropriate is a worthwhile exercise in itself.

CHAIR—Professor Stocker actually mentioned the water agencies and raised a matter which he believes is of importance—that is, who owns the intellectual property or data that is collected by some of those agencies and who can use that. That raises questions about the capacity of people to do the long-term research. Do you have any view on that?

Mr Willett—Again, there is a question about whether that should be the business of organisations who are focused on provision of water services or whether we should be providing that task more generally to an organisation who is better equipped to undertake that responsibility. That might involve the purchasing of data or the contracting of service providers to undertake those activities because they are in the best place to provide it.

But what we have identified is that the provision of utility services in particular, on the basis of what you might call altruism—the way these businesses have been conducted in the past—does involve considerable waste of resources. Focusing those service providers on their job of service provision involves considerable community benefits.

There is another step you need to take in identifying those areas where those service providers may not have all the incentives to conduct activities which are in the

broader community interest. It is important to identify those and to ensure that, where appropriate, they are conducted and that those service providers, where they are the right organisation to conduct those activities, are contracted to do that.

CHAIR—Just before asking other members whether they want to proceed with questions, I want to raise one other issue about the community service obligation, how that is identified in future budgets as a line item in various agencies and the provision of services if there is subsidised pricing. Do you think research and development should be itemised in a similar way or is that taking it too far?

Mr Willett—I think it is taking it too far as a general proposition. It is one way. In the Australia Post work we identified four ways in which community service obligations could be funded and met. Cross-subsidisation between services is one way. Other ways include simply identifying clearly in the organisation's charter what community interest obligations it has imposed on it and then recognising that it has those obligations in the return to government that is expected from that organisation. Direct public funding of identified activities is a third way. Another way is to impose a levy on participants in service provision, particularly where you want to introduce more competition in service provision, and to fund those community interest activities. That is the approach that was taken with the phased introduction of competition in telecommunications.

I think any of those approaches might be the appropriate approach to ensuring that those CSO activities are undertaken, depending on the characteristics of the industry and how big a proportion the CSO activities are compared with the core functions of the service provider. I am aware that there are sometimes concerns about direct budget funding and that that funding might then become vulnerable to subsequent budgetary processes. There are then some guarantees you can put in place to ensure that that funding remains where that is a concern. Approaches that we have looked at to deal with those concerns, in the context of the Australia Post inquiry, include some legislative backing or some sort of funding over a longer period than just the financial year with guarantees.

Mr BEDDALL—Lots of luck with that guarantee in a budget context and lots of luck with getting the funding more than one year in advance. My question is in two parts really. How much competition reform fatigue is there out there at the moment and, if you look at one sector of the industry, how may competition have enhanced R&D? Some years ago this committee conducted an inquiry into super conductors. Part of the evidence, if I recall, was that the electricity companies virtually spent nothing on R&D. They generated power by burning coal or gas and that is how it was always done. They did it fairly efficiently but they never did any R&D.

One of the key elements of competition policy has been the sort of streaming of electricity generation in generators, distributors and retailers. First of all, is there any evidence that that may lead to higher R&D because there is a competitive factor involved

in that industry that has never been there before? Secondly—I cannot recall the evidence—it seems the competition council is continually saying that you will not get \$16 billion unless you keep up the efforts of reform. How real is that fatigue? I am a Queenslander and both sides of the political fence in Queensland seem to have competition fatigue.

Mr Willett—It is a difficult issue and one that is very difficult to generalise on. I know there is a general view that the community is tiring of the reform process. I do not think, as a generalisation, that is backed up by the evidence. In fact, in many areas the reform process is proceeding at a more rapid pace than it ever has in the past. We are nearly complete with electricity reforms on the eastern seaboard and the introduction of the national electricity market. We have nearly finished reforms in the gas area along a similar line to ensure free and fair trade in gas nationwide.

The legislation review process is proceeding. It is problematic in some areas. I think it is fair to say that it is very easy to see the council's role as being very negative in this process. We were, after all, tasked with ensuring that this competition policy reform process retained momentum, recognising that there are political difficulties associated with that.

I think where you can generalise about community concerns about the competition process is where there are direct and immediate employment implications from a particular reform process. Certainly, there is some increased sensitivity about those sorts of issues now. I think we saw that in the debate on tariff reform in terms of motor vehicles and TCF. I think those particular areas recognised or reflected some concerns about what this all meant for the community.

But I do not think that is broadly true. I think people are starting to recognise the benefits of the reform process in the utility services in particular. There has been some publicity here recently about the liberalisation of another tranche of electricity consumers and offers of savings that are being made in that context of up to 40 or 50 per cent. When you start getting those sorts of developments it is very helpful in building community support for those sorts of measures.

In terms of what competition policy reform means for innovation, it is difficult at this stage in the process to do any more than comment in principle. Yes, in principle, competition policy reform should mean more innovation. It should mean people look to exploit opportunities in newly liberalised markets and, therefore, you would expect to see more research and development in alternative ways of doing things because a lot of the benefits of competition policy reform are not necessarily competing in doing things the same way but finding new ways of doing things.

There is some evidence of that in electricity already. New South Wales has done some particular things to encourage the development of electricity generation activities in

ways that are more environmentally friendly. You can only take that sort of approach in the context of a market that recognises electricity consumption from different sources.

I think there is also certainly anecdotal evidence of people thinking about different ways of generating electricity and, in particular, in the convergence between electricity and gas markets through generation of electricity using gas. Again, that involves some innovation and some broader benefits to the community in terms of environmental impact.

Mr Campbell—I think, too, in the area of water reform, where the national competition reform process is just getting under way, you are going to see more development of water markets, niche markets, and that is likely to encourage greater research and development into things like water purification, reuse. So I think we can expect to see greater action there as water markets develop and people realise opportunities, and that will stimulate action to look at particular problems which have existed in water in the past.

The fact that water is occupying a central role is because of the extent to which systems like the Murray Darling basin have been overused and there has not been, in general, a good body of evidence to support the allocation of water. What we are going to see in the future, and what the task force is looking at, is more organised research and development and greater dissemination of that within Australia. I guess the other comment I might make—

CHAIR—Before you move off water, which I have a very active interest in, I wish to ask you about your review that you carried out on the water industry. Could you make available the results of that review to the committee?

Mr Willett—Certainly.

Mr Campbell—A final comment I will make about reform fatigue is that one of the things which is beginning to drive the process a bit is increasing community awareness. Certainly, in the legislation review area, people are increasingly becoming aware of the extent to which regulations affect their daily operations and now see a process for thinking about whether those are all in the community interest. Businesses are also beginning to look at how they are affected in competing with public businesses through the competitive neutrality process and have a greater awareness of their ability to make complaints through the complaints mechanisms which all governments have set up.

Mr O'CONNOR—One of your roles is to recommend access to services which are of national significance for competition, the access declaration. Could you explain that a bit further?

Mr Willett—The national access regime in part IIIA of the Trade Practices Act has three streams within it for means of providing access to natural monopoly

infrastructure. The national access regime and the agreements recognise that states and territories will want to put their own access regimes in place in relation to particular infrastructure. It is possible for them to seek from the council a recommendation to the Commonwealth Treasurer that those regimes are effective and, therefore, those regimes govern access rather than part IIIA of the Trade Practices Act.

The second stream is that it is possible for infrastructure owners who think they have facility services that are amenable to the declaration to seek a voluntary undertaking with the ACCC on access. So they go to the ACCC and say, 'These are the terms and conditions by which we are willing to provide access to all comers on; do you approve?' It is the ACCC's job to look at that undertaking.

The third stream is the declaration process. Anybody can come to the council and seek to have a particular infrastructure service declared for access. The council will make a recommendation on that after considering the application against the criteria that we have to apply in the Trade Practices Act. We will make a recommendation to the Commonwealth Treasurer or, if it is state owned or territory owned infrastructure, to the respective state or territory head of government. What declaration means is that it provides an enforceable right to negotiate access backed up by compulsory arbitration by the ACCC.

Mr RICHARD EVANS—I have been listening with interest to what you have been saying. I am trying to get my mind around this whole issue of R&D. I do not think I have actually heard you say what the best process might be to encourage R&D in greater dollar terms in Australia. Do you have a view on that?

Mr Willett—R&D is a very broad area and sometimes involves some market failures which have been recognised by governments. In some cases there are strong commercial incentives to conduct R&D and there are strong market mechanisms to encourage R&D. On other occasions it is possible that R&D activities will involve some spillover effects, some benefits to the broader community that cannot be captured by the particular entity that is conducting the R&D. That is recognised with things like the tax concession to R&D expenditure. What that policy measure is designed to recognise is that there are broader benefits from R&D activities.

Then there are R&D activities that really are unlikely to be conducted in the context of the market. In the materials that were provided to me, there was reference to R&D expenditure with public good characteristics. Public goods are a very narrow area of very marked market failure, which means that it is likely the only way R&D activity is going to be conducted is if it is publicly funded. Again, I think that is well recognised in government policy both in terms of Australia's institutional arrangements and the sort of R&D arrangements that are publicly funded.

Mr BEDDALL—Some of the criticism would be that, because there is a more

commercial focus on what used to be government monopolies—and they were benevolent to everyone—that now has to be actually focused, and people say that it is that much harder to get the money. But I would put that probably the other case is also true. If the research is needed to be done, then it should be funded by those people who need it to be done—that is, the public good, rather than using institutions.

You find that there is a resistance to competition policy because of that—that what used to be a catch-all from a public institution had lots of money. The committee is going to the Telstra labs. When I was minister for it, you had stacks of research that really did not have a lot of focus. It was good research, but it was research for the sake of it. That does not happen as much under a commercial environment.

Mr Willett—Yes, I understand that. I think there is a question with public good R&D about whether service providers are the right organisations to be doing that. That is because, by definition, public good research and development has no commercial focus; it does not operate well in a commercial environment. The sort of R&D expenditure that might be an issue, and is more of an issue, I think, for service providers, is the category of R&D expenditure that has some spill-over effects for the broader economy but still has some benefits to the service provider.

Then there is the question: we have some general policies to facilitate that sort of R&D; why don't they work just as well for corporatised government enterprises as they do in the private sector? I would have thought that, if there is a problem there, it is a problem more broadly across the economy in not recognising that those R&D activities have a broader community benefit, or some component have a broader community benefit, rather than saying that there is a problem there with commercialisation.

To wrap up: I think it is important that, where organisations had formally conducted public good type R&D where they were essentially service providers—and, as I said, there is a question about whether they are the right organisation to do that—it is certainly worth while to identify those things and, where they are assessed to have net benefits to the community, make sure that they are carried out.

CHAIR—Mr Willett and Mr Campbell, thank you very much for appearing before the committee and for being so free with your information.

[10.04 a.m.]

BROWN, Dr Gordon Gibson, Executive Officer, Australian Academy of Technological Sciences and Engineering, Ian McLennan House, 197 Royal Parade, Parkville, Victoria 3052

LAVER, Mr Peter John, Fellow, Australian Academy of Technological Sciences and Engineering, Ian McLennan House, 197 Royal Parade, Parkville, Victoria 3052

CHAIR—Welcome to the proceedings of the committee. I remind you that the proceedings here today are legal proceedings of the parliament and warrant the same respect as proceedings in the House. The deliberate misleading of the committee may be regarded as a contempt of the parliament. The committee prefers that all evidence be given in public. But should you at any stage wish to give evidence in private, you may ask to do so and the committee will give consideration to that request. Would you care to make an opening statement before we proceed with questions?

Mr Laver—The academy welcomes the opportunity to make this presentation to you, and we certainly have welcomed the agenda of public policy reform that has taken place in the last decade. However, we observe that not much of that reform process was directed at enhancing the expenditure on research and development, although some of its impacts have had an incidental effect on both the manner in which research and development—new technology development—have taken place and the amount.

The first part of the decade that we are talking about certainly saw a significant increase in research expenditure in Australia, particularly research expenditure by business. However, although the statistics are not yet available, there is much anecdotal evidence that would say that there has been a decline in the last two or three years, particularly in the business sector. This is obviously worrying, and it obviously has implications as far as the future of the country is concerned.

It would be fair to say that many fellows of the academy would believe that the current government lacks a commitment to research and development in some of the budgetary measures they have taken. It is not that the academy is criticising the need to balance the budget, and so on. But it is a statement of fact that research has probably taken a little bit more of the share of the burden than some other areas.

We believe, in fact, in many of the budget statements and other statements that have been made, that the current government probably sees R&D as a cost, or a cost to revenue, rather than as an investment: something that you outlay now with the aim of achieving a return in the future. I think the academy's view very much is that R&D is an investment: that you put out money now in the hope of achieving returns at some future time.

The main impact of the public policy reform that we have seen, in terms of its impact on research, has really been on the longer term research and on the research that you might say has an element of public good in it. The straight commercial 'fix a problem that is sitting here today' short-term stuff, business has always done and will continue to do.

I think the greatest illustration of the change has come about in the utilities—in gas, power, water, and the like—and that is the area of the main focus of the academy's submission. What has happened in these areas in general is that, while expenditure may not have dropped all that much—and it is still very hard to tell—there has been a shift in focus to far more short-term research. There has been a lot of adaptation of overseas technology to Australian conditions and calling it research, rather than developing new technology here. Also, increasingly—particularly, to my knowledge, in the electrical industry with many overseas power companies buying into the local market already having research facilities in their home country—a lot of the research that is being done is being shifted into offshore laboratories. So the spend might not be the same, but where it is being done is different.

Obviously, if you have a laboratory sitting in Atlanta or somewhere, you are not going to put up another laboratory here under the current conditions—and I guess that is an area that we should perhaps explore as to how we can encourage more overseas companies to perform research within Australia. That is certainly something that would be very strongly supported by the academy.

I happen to wear a number of different hats. One of them is that I have been the Chairman of the Energy Research and Development Corporation, which at the last budget the government chose to wind down. We are still alive and trying to work out how we are going to finally liquidate. But, basically, we have had a year where we have had no new activity. But we have kept in touch with our constituents. A lot of them are people like the members of the Australian Gas Association and the members of ESAA—the Electricity Supply Authority Association—and we do get a very strong sense through ERDC of this change.

When the ERDC was active and before the major impact of the public policy reform hit the electrical industry, the 'Pacific Powers' and the 'SECs' of the world were funding a lot of research into long-term things like renewable energy, more interesting ways of conserving energy, and the like. That has just been scrapped completely. Basically, their focus is very short-term on trying to knock 0.1 of a cent off the price of generating power; that is very much the focus of their work. It has been a similar experience in a number of the other public authorities. But it was a very marked change we saw when the ERDC was in full flight. I guess the abandonment of the ERDC, for reasons that have never been fully explained, is probably an illustration of the sorts of concerns that the academy has in terms of the level of commitment the current government has to expenditure on commercialisation of Australia's research activities.

It is not all bad, however, and I think the academy would strongly support the continuing commitment to the CRC program, which we believe has been a very useful way of getting business to work with academia towards mutually agreed and commercialisable goals. We also would applaud the continued support for the ARC, the Australian Research Council. While they never have enough funds, and the success rate of ARC applicants is still below 20 per cent, we do believe that at least it last not got worse.

The only problem with that is that university research in Australia tends to be research that is academically oriented; rarely is it seen as something that is going to contribute to commercial development. One of the main reasons for funding research in university is to train researchers to go out into other jobs to actually do more commercially oriented research. The problem is that we are still training the researchers, but the number of jobs that are available in the community for researchers is certainly not expanding at any great rate. This will act as a deterrent to other people wanting to take that route.

In many respects, I think to continue to support the ARC but to be a little bit indifferent about supporting the broader research in the community, particularly in business, is perhaps a little bit of a waste of the community's investment. They are training a lot of people who perhaps will find it more difficult to employ the skills that they have gained. Notwithstanding, it is very encouraging that that sector is still alive—although I think that if you asked the chair of the ARC, she would say that they could quite easily do with twice as much money as they have right now.

The START program is certainly a positive. I think our fellows would see it as a positive initiative. It is still a little early days to find out just what role it will take. But, clearly, anything that stimulates activities in these areas is obviously something of interest.

I have not tried to talk to the submission in detail. I assume that you have seen it and read it, and are quite happy about answering any questions.

CHAIR—Thank you very much for that. There is one particular aspect, and you did touch on it quite a bit: the Australian electrical industry. On page 2 of your submission, you state that ‘the fragmentation of the Australian electrical industry and other factors has eliminated any possibility that an Australian utility will become an international force in the area able to justify the support of large R&D facilities’. I wonder whether you are suggesting that the Australian electricity industry was in a position to become an international force before those recent public policy reforms were made.

Mr Laver—I think there had been some fairly significant investments in offshore activities by people like Pacific Power and SECV, and I think we have seen some curtailment. Pacific Power, I believe, still do have an international arm, but I do not think it is anywhere near as robust as it was before. They have had to refocus their attention. I think you would have to ask somebody close to the electric industry about how well they

might have done had they not experienced the changes in recent times. As I say, I think it is going to be a different story for each of the organisations.

CHAIR—I speak with some knowledge of that industry. As a former chairman of the Natural Resources and Environment Committee of the state parliament, I had the pleasure to do the report for the Cain government on electricity supply and demand. That left a few gaps, which were quite obvious, in the R&D that was being done. I think you touched on this in your evidence to us: some of the research was well directed, but some of the research and their involvement in some of the overseas projects were not as well directed as may have been desirable. That is why I wanted to touch on that aspect of it, in view of the public policy reforms that are taking place in the current environment. Thank you for your view on that.

Mr BEDDALL—I will just take that Pacific Power point up. It was something that was very evident. For example, Pacific Power was quite dominant in Asia in reaching out to markets, before being split into the three corporates. Then the Asian electricity generator asked, ‘Where did Pacific Power go?’ And there was a lot of opportunity for Australian generators—as you would be aware, I am sure, and you can comment—to help either build new power stations in Asia or, more importantly, retrofit them, because a lot of their power stations are not generating capacity to the stage that they are in Australia. Are your members saying that basically what has happened is that, because you have to compete with yourself—which is basically what Pacific Power is doing—there is no other focus at the moment?

Mr Laver—Yes, and many of them have shareholders who are looking for shorter term returns. They do not have the luxury of being able to take the longer term view that, ‘Okay, we’ll form an association with Vietnam and nurture it, and our rewards may be 10 years away.’ That luxury is no longer there. That is not a criticism; it is just a fact of life of the way in which a market works.

Dr Brown—This statement was also made in the context of the expectation that the number of power companies around the world will shrink to a relatively small number. Consequently, there is a process of aggregation going on at the moment.

CHAIR—In your view, if that pattern of the internationalisation of the power industry continues, who do you see as filling the gap in the R&D area?

Dr Brown—The research and development will be done by the large corporations; and we are only a part of the large corporations, so it will be done offshore.

CHAIR—What part do you think the cooperative research centres will play in that scenario? Is there a place for them? How much can they do?

Dr Brown—There is a very good place for them. But, bearing in mind that some

of the research that is required for strategic purposes well exceeds the known funding terms of the CRCs, the CRCs are more appropriate to what I might call 'medium term' in that sense rather than the longer term strategic work. Hopefully, that will go on, but you cannot guarantee it.

Mr BEDDALL—Is it fair to say that, as the power industry shrinks, you will get more a standardised power station, even to the extent that you will build a pacific turbine that runs on a specific coal mix, and so the research probably would be rather more focused on standardising the component of a power station than trying to find new ways to do it?

Mr Laver—Say that there is a CRC on coal utilisation, for instance. If there is a particular corrosion problem that happens to occur in a power station using a particular coal, that is the sort of research they will do. They will not be standing one step back and saying, 'Can we do it better; is there a new sort of burner that we could be buying?' We will be buying our burners, the research for which will have been done somewhere else in the world.

Dr Brown—The local industry simply will not have the size to fund the major developments that will come along.

Mr BEDDALL—The major research into black coal gasification was done by Idemitsu in Japan, not by an Australian research organisation.

Ms GAMBARO—I would ask for your comments on recent reports that have been produced, including the Mortimer report. The main issue that kept coming up there was the overlapping, inconsistent nature of the R&D research currently being carried out; that there seems to be no consistency in it, and many areas seem to overlap. Also, there is the industry report that has been released very recently by the government—industry policy. Would you care to comment?

Dr Brown—On the first one, on the overlapping, we agree that streamlining government procedure is a good idea. However, we also believe that centralising all research and development funding into one agency, as recommended by the Mortimer report, would probably be counterproductive. We are rather wedded, as is Professor Stocker, to a pluralistic approach to funding for research. Much can be done to improve the efficiency, but we would not like to see it all combined into one agency.

Ms GAMBARO—So you feel that combining it into one agency would have a detrimental effect?

Dr Brown—We believe so, in that it would perhaps not allow for the diversity of opinion and approaches that you get under—well, some variant of—the present system. Your second question was?

Ms GAMBARO—I would like you to comment on the current industry policy that the government released a little while back on investing in the industry sector. Also, please make any comments you may have on specific relevance to utilities.

Mr Laver—With regard to the utilities, I have spoken to the ESAA. I do not think they have made a submission yet, but they are planning to do so. It would probably be best that they speak for themselves.

But, speaking more generally, with the industry statement—and I am sure the academy generally welcomed it—research really was not the centrepiece of it in many respects. I guess that it is in that area that there was some disappointment, particularly with respect to the failure to increase the tax concession for research. That is something that is fairly strongly felt by a large number of companies whose research people tend to be fellows of the academy.

Certainly, there has been a change, and perhaps we are picking up this sort of perception that there are signals that research is not seen as important now in the community as it was 10 years ago. That is certainly a perception that a large amount of corporate Australia has, and I do not know that the industry statement went a long way to dispelling that perception.

CHAIR—Thank you for bringing this inquiry to the attention of the ESAA; I look forward to their submission also.

Mr RICHARD EVANS—I noted your comments about the government and their attitude towards research. Which countries would you consider are benchmarks, and what are they doing in relation to their own research?

Mr Laver—The benchmarks in many respects are hard, because we have to look at our conditions. Our market size makes us different from a lot of the countries. It is very easy to talk about the UK, the US, Germany or somewhere else. But, by and large, we cannot really compare ourselves. We are 2 per cent of the world, and all these types of things; in fact, perhaps we punch above our weight already in total science effort.

I am not sure—and this is a personal rather than an academy view—that the comparison with some of the Asian countries that put in some very attractive research incentives, such as Malaysia and so on, are valid either because they are building up from a much lower base and clearly have a different focus and a different way of promoting industry policy.

I sense that we really cannot, in my belief, benchmark ourselves satisfactorily against anyone around the world and say, ‘Well, we’ll have one of those,’ because our situation is unique. We are a Western country, a sort of middle level OECD country. If you look at those with us on the OECD table, there are not too many that you could say

can provide us with a phenomenal amount of guidance.

I think we have to look at what is good for this country. I would suggest that what we do need at the present time is an ongoing economic environment that will encourage private industry, in particular, to invest the same proportion of their revenue in research as some of the OECD countries that we would compare ourselves with. Generally, we are down in the sort of 0.5, 0.6 range. I think we would say that the benchmark is probably double that.

Mr RICHARD EVANS—You were suggesting though that they would not do that, unless greater government incentive were being given.

Mr Laver—No. I was careful to say that it has to be an environment that encourages it. I do think there are many industries necessarily looking for government handouts—although none of them would knock them back, if offered. But, by and large, it has to be an environment that encourages innovation and development of new technology, which is a multifaceted thing that will not only be just straight tax concessions but it will pervade the whole range of the way in which the financial markets will invest in new technology, government purchasing—a whole range of policies in relation to industry development that would somehow or other encourage people to invest more in research.

Again this is a personal view: I believe that one of the problems we have in Australia is that the perception has always been that we push more money in the bottom and something somehow happens at the top. We have not really paid enough attention to how we can create a demand for research and drag it through. If we keep pushing it in the bottom in some blind faith that somehow or other we will get some useful results, I think we are doomed to disappointment. I think we need to look at the risk of people buying new technology to try to reduce that risk.

Mr RICHARD EVANS—Now I am confused. I do not disagree with what you have just said, that we need some sort of attitude towards research and development that is beyond an economic process. But you said before that research has dropped off because of the government attitudes and economic attitude towards research and development. Also, I have asked you whether it is just simply increasing the rebates back, and you have said no, that it should not be. What sort of things should the government be doing then—not this government, but let us make it more generic and say policy makers?

Mr Laver—Certainly taxation concession is an easy one and one that would be welcomed by a large number of people. That is, if you like, necessary but not sufficient. Just to promote more research is not necessarily going to be of benefit to the economy—and I think the government was right to be concerned with some of the fairly imaginative taxation schemes that grew up around the R&D concession, and I think that gives research a bad name.

I think that just stimulating more research is not enough. It has to be looked at holistically. It has to be looked at in the way of somehow or other encouraging people to use the technology developed in Australia. In that way it gets into export promotion; it gets into perhaps schemes that will somehow or other reduce the risk of using new local technology; it gets into the ability of government to stimulate demand in different sectors through other types of industry policy that will pull through research.

These are the types of things that I believe need to be part of a total package. There is no shortage of literature on this. There have been reports written on these sorts of things for the last 15 years.

CHAIR—Just to follow that up: we get back to ownership of, and access to, intellectual property.

Mr Laver—Yes.

CHAIR—I wonder whether the academy has done any work on that, particularly in the changes in the public utilities. Have you done any review or research into what has happened to a lot of the intellectual property that was held by some of those public utilities and whether it did become available to other sources? That follows up the message that Mr Laver was giving to the committee.

Dr Brown—The academy has not done any particular work on that but it has strong opinions on the one that came up in evidence earlier this morning on the water records. We see that as an extremely urgent matter to sort out. I understand that some state governments have legislated for continued access by public researchers, say, in the universities, even to the records that just exist, never mind the ones that have yet to be created. We feel that this is one by-product of the privatisation of the water industry that needs to be safeguarded and it needs to be done quite urgently.

CHAIR—As well as having access to the intellectual property and having the taxation incentives, is there any other proposal that you would like to put before the committee in terms of more targeting the research and development that is done?

Mr Laver—I think we would have a real bunfight in our academy if we started to try to say that you pick winners in different technology areas, because we are a fairly broad Catholic church as far as which technologies we come from. In many respects it would be nice to think there were mechanisms that allowed the strong ones to get stronger and the weak ones to perhaps join the strong ones.

I would think that the strong endorsements that we would have to give would be to things like the CRC scheme which we believe has been useful. It is still a little early to know what the outputs are. In many respects it would be nice to think that we started to allocate future funding for CRCs based on their achievements rather than on their

promises. They have been going long enough now to be able to a start to introduce an element like that.

Certainly we need to continue to fund the universities at least as well as we are now, if not marginally better, to make sure that young people are attracted into research and that there are career paths within academia for them. We need to continue to support the good work that CSIRO does and we need to make the sure that the linkages between the universities, CSIRO and industry are underpinned so we can get some better value out of the research that is done.

Some people are of the view that we do not need any more research in Australia; we need to make better use of the research that we are already doing. There is probably an element of truth in that. We seem to have run to a grinding halt when we get to the situation that we have proved the technology but somehow or other we need to do something—we need to build a pilot plant or a demonstration model or something so that we can go along to a bank and raise some money from it. That is why I still regret the departure of the ERDC because that was exactly the sector that ERDC was working in. They would not fund pure research. You actually had to prove your technology and perhaps even have your patents but ERDC would match anything between a one to one up to a one to five—one of government money up to four or five of the actual owner's money—to build the next stage so they have actually got something that the venture capitalists can come along and kick the tyres and say, 'Yes, that looks at though it is going to work. We will lend you money to develop it.'

We are stumbling in that area. We saw dozens and dozens of entrepreneurs and technology developers coming to us with just this problem. That was only in the energy sector. There could be a whole range of other sectors where the same problem exists.

Mr BEDDALL—You mentioned that we were punching above our weight. In fact, I think we fight below our weight. We often forget but I think we are now the 11th biggest economy in the world. We were fighting the Koreans for that but I think they retired hurt.

Mr Laver—I was talking about research expenditure as a proportion of GDP.

Mr BEDDALL—Yes, but as a GDP country, I think we are the 11th largest economy in the world. We are nowhere near the OECD average on research. We need to find new ways. The CRC was an innovative new way. I would like your comment. In the past it basically has been left to CSIRO and government research. We do not seem to have the corporate body in Australia that actually gets involved. A country the size of Sweden has Volvo, Saab-Scania and a whole range of fairly major companies. We do not have that. We have very good mining companies and have done some very good things in that sector. Is that our problem—we don't have companies of critical mass and those companies that do have a critical mass are not involved in fundamental research?

Mr Laver—The people who actually pay me are a mining company, a small one called BHP.

Mr BEDDALL—The first export of CD-ROM technology was how to work a long line coal mine.

Mr Laver—That is a problem with our industry structure. I would make two observations on it. One is that exploration is to a mining company what research is to a manufacturing company. If you wanted to be genuine about how you measure our research performance, you add exploration plus research. In fact, we come out not badly on that scale.

Secondly, mining companies are users of technology rather than developers of technology. The technology that they develop for themselves will usually be to solve a particular problem with a particular deposit that they have. Mining companies do not necessarily see their mission in life as to develop a new piece of mining equipment. They would rather a very vigorous supply market out there developing new pieces of mining equipment and they can pick up the one that suits them best. If you start to develop your own equipment, you are locked into using it and it might be the fourth best piece of equipment and you could actually undermine your own competitiveness by starting to develop your own technology. The time that you develop new technology as a mining company is if there is just nothing there available and no-one has any incentive to develop it for you.

Our industry structure certainly does influence our performance in a lot of areas but that does not mean that we cannot be doing a lot more, particularly in some of the these niche areas where we seen by the world as being good at this and our technology is going to stand up. If it was in mining or dry land agriculture or in sport—these types of things where the world sees Australia as leaders—I believe we should be underpinning some of our technology development. We are not seen by the world as leaders in space science, telecommunications or anything like this. If you go to Chicago and try to sell an Australian telecommunications device, you have a big hurdle to jump. If you are selling a piece of Australian mining equipment, you would get a far better entree.

Mr O'CONNOR—I was interested in your comments about the development side of this equation in research and development. My experience in the parliament to date and in public inquiry after public inquiry is that we seem to come back to this one particular point—a very innovative culture, one that has a capacity to do unique research at various levels and in various ways. But we stumble at the development phase and our financial markets and there is not a culture there of risk or there are not the vehicles and mechanisms to assist those with the research into the development phase and into the market place. Are you in a position to make comment on that a little further?

Mr Laver—It is a correct assumption. It is amazing that most of the financial

houses will have a whole bevy of people who are real estate experts, for instance, and know all about property development and the risks involved in it and understand it perfectly. But you will search around to find anyone in some of those places who has any understanding of technology.

The problem goes one step further back. I belong to a superannuation fund, and I am not sure I necessarily want them to go gambling with my money. The problem is this intermediate stage. It seems to me that the pre-venture capital stage is the gap in Australia. In countries elsewhere there is a large range of different sorts of organisations that will put money into those types of things. Quite often part of the defence budget in the US for instance will fund early stage technical ideas to get them to the stage of being commercial. Sometimes it is various foundations and sometimes it is what are euphemistically known as angels—individuals with high personal wealth who are prepared to listen to people who have bright ideas.

It is something that seems to be missing in Australia. You cannot go to the Australian Defence Department and say, 'Hey, I've got this idea for this whiz-bang new piece of equipment but all I have done is build it in my backyard at the present time. Will you give me some money so I can build 500 of them to demonstrate them?' They will say, 'Come back when you have a commercial product and we will assess it alongside everyone else.'

Mr O'CONNOR—What do you see as the role of government and the responsibility of large companies from the sector from which you come in this regard? I am just interested in your comment. I am not engaging in aggressive debate here. It seems to me that given the size of this economy and the potential to commercialise this excellent research that is on the ground, we seem to lack any sort of strategy within government to exploit the purchasing power of government via, for example, the Defence Force to encourage certain technologies. I have one in my electorate at this point of time that could do with the sort of sponsorship that you are talking about both from the Department of Defence and from your industry, the mining industry. What role does government play in all of this to stimulate this development phase of this equation?

Mr Laver—Again, this is not necessarily an academy view although it has been talked about. We have to look at it from the end of the person who is purchasing the new technology. What they need to do is find ways of lowering their risk. If you buy new technology, if you can go overseas and see it and feel it and so on, it is virtually risk free. You might have to adapt it to Australian conditions. But if it comes along as a concept here, someone may have cobbled together a prototype and you do not know whether it is going to work or not. Your heart says, 'Hey, it would be terrific to support this but the risk is too high. I might put a lot of money in it and it fails. I can get second-class technology from somewhere else but it is basically risk free.'

We have to look at the risk in the hands of the purchaser. I have floated the idea a

few times and usually people say that it is a good idea but it is too hard. It is almost like an EFIC scheme for new technology that basically says, 'Okay, if this is a registered new technology of some description'—you can probably go through the IR&D board to get registration—'I can actually take out insurance that it will meet the specifications that it claims.' Then the inventor has an easy way of raising money because he has an order sitting up there. Until they sell something, they do not know whether they are able to repay.

If you can somehow or other reduce the risk in the hands of the user of the technology, you do not have to worry about giving the producer of the technology anything more because the banks will come flocking to his door because they have an assured revenue in prospect one way or the other. Both sides win: the inventor gets the incentives to go through to development and the purchaser of the technology either gets a superb piece of technology, which hopefully it will be, or if it doesn't turn out to be superb, he has laid off his risk by some sort of insurance scheme. It is not easy.

CHAIR—Dr Brown, do you have any final comment?

Dr Brown—I have just a couple of comments. We have touched on CRCs. One very important aspect of CRCs is the culture change that it was intended to introduce. The evidence seems to be starting to come through—a little bit anecdotal at the moment—that it has introduced a very large culture change into the universities. Particularly the higher degree graduates that are coming out with PhDs or masters from the CRCs are much more attuned to the needs of industry and understand it much better. They have some smattering of financial understanding and are much more immediately able to go into firms and perform well and are much more in demand by firms. Perhaps we need some kind of scheme to change the culture in the finance industry in a similar way.

We still seem wedded to the single idea in this country that the most benefit is going to come out of the brand new idea that is completely original and new, whereas, in fact, the experience is that much of the wealth of the country comes from incremental R&D where the novelty is perhaps a little more difficult to pick but where you are adapting it or standing on somebody else's shoulders and going a bit further. This is particularly important in the current review of the definition of eligible R&D, which we have about a week to respond to, which has just hit the decks. Once again, I think the tendency is to squeeze out the incremental improvement R&D, which can be very substantial, but there is a very high test of novelty. We think that is perhaps unfortunate.

CHAIR—Thank you very much. I thank you and Mr Laver for appearing before the committee. It has been most helpful this morning. We thank you for taking the time and the effort to put in a submission and to appear before the committee.

[10.47 a.m.]

BROWNSCOMBE, Mr David, General Manager, Commercial Research and Technology Development, Rio Tinto Ltd, 55 Collins Street, Melbourne, Victoria 3000

CHAIR—I welcome Mr Brownscombe to the committee's proceedings. I remind you that the proceedings here today are legal proceedings of the parliament and warrant the same respect as proceedings in the House. The deliberate misleading of the committee may be regarded as a contempt of the parliament. The committee prefers that all evidence be given in public, but should you at any stage wish to give evidence in private, you may ask to do so and the committee will give consideration to your request. Would you firstly like to make an opening statement before we proceed to questions?

Mr Brownscombe—I would like to spend five minutes or so recapping some of the items in the submission or perhaps expanding on them a little. There are really three elements to that submission that are important to us. One is the comments about globalisation. At the very latter part of 1995, Rio Tinto moved to being a really global company. At that stage it was the old CRA and RTZ; they merged to form a dual listed company at that time.

What has happened since in the R&D area is, for me, quite interesting. The organisation in total is broken up now into eight what are called product groups. Research and development is carried out within each of those. It is also carried out in a centralised facility that we have here in Melbourne and a centralised facility in Perth. Those areas are in fact providing that central service to the other product groups.

What is emerging is that with that centralised facility here in Australia the other product groups have been given the option as to whether they use that facility or not, which means that that facility has in fact become very attractive. My feeling is that the way it becomes attractive is, first of all, through the quality of its people. We do need good technologists, and in fact we do have good technologists.

Secondly, the cost looms always as an important factor. So we have to be efficient and we have to get that work done at a lower cost than competitors overseas. Thirdly, we need to have backup in the form of organisations like the CSIRO, the universities. The previous speaker spoke about CRCs. That is now regarded as an important element. Something that should not be overlooked is the independent laboratories. I say all that on the assumption that we do really want to be competitive in Australia with R&D for all the good reasons for doing that.

The second major area is the nature of short-term development versus long-term R&D or perhaps long-term research. Our experience is shaping up such that the short-term development work, incremental improvements, more or less get done regardless. But, on the other hand, the research element of R&D, in an environment that exists now in the

organisation, is starting to look a little shaky. A view says that that is because, with the emphasis on shareholder value—and I always interpret that as getting quick shareholder returns—long-term research is somehow in conflict with that. So it is necessary to do whatever can be done to encourage our decision makers—let us call them the funds approvers—to still provide funds for long-term research.

The main area where that long-term research would be carried out is in the centralised facilities in this country. But it is going to require us to continue providing support—the sort of support that exists at the moment. The CSIRO is giving us excellent value. There is no question about that. It is a 25- or 26-year relationship to my knowledge. Apart from one or two minor incidents, everyone speaks well of the CSIRO.

The universities have provided us with excellent graduates and they have provided us with good research facilities when we have needed it. That is an area that we in Rio Tinto believe should be enhanced.

Like the previous speakers, we are beginning to see the culture change resulting from CRCs and the technical benefits resulting from that initiative. I believe there are about 60 CRCs at the moment. Rio Tinto would be encouraging that there be a greater number.

Laboratories like AMDAHL must continue to be supported, and CRA has previously taken some initiatives in doing that. Without the independent laboratories there, there is just another avenue of attraction for our overseas arms to do their research here.

Finally, the R&D tax concession is of concern to us. We were disappointed with the cutback to the 125 per cent. It has not been a disaster for us, but I do have to say that, in terms of providing support to get long-term research done, the 150 per cent incentive was something of a clincher when presentations were made to the funds approvers—the senior people in the organisation.

We have had two examples mentioned in the document, the high smelt example. That work was previously being done in Germany and a decision was taken five or six years ago to bring the work to Australia. I certainly cannot say that that was all due to the 150 per cent tax incentive, but it certainly played a part. The work done in Comalco with the drained cathode development has taken place over about 10 years now. The fact that that project has remained and been supported has, in part, been due to the 150 per cent incentive.

I enter an area here of a little difficulty on a personal note because the organisation called Rio Tinto is not out looking for what you would call straight subsidies. But in this area where the research is going to benefit both Rio Tinto and Australia we are happy to accept that support and would encourage it.

Just to get us off the short introduction, I would like to make a small plug for mining. The image of mining tends to be one of geologists chipping at rocks, dust and explosions, more dust, big trucks, long trains and perhaps, in recent times, industrial relations reform. But, in fact, the reality is that there is enormous amounts of high tech work being done in the exploration area. Exploration geophysics is an emerging field. It has been around for a long time, but it is gathering pace now as all bodies become more difficult to find. What is found is more difficult to extract.

There is certainly a requirement to remain on the edge of materials technology with larger trains or larger trucks. Materials that would have been fine in something slightly smaller will break when you start to really push the edge of technology. A lot of energy and a lot of innovation and technical effort goes into that area. Taking these lower grade and more complex ore bodies that are found and processing them is where there are some real challenges. You will be aware of the Century deposit in Queensland. That only became a mineable ore body through processing innovation that would otherwise have left the ore body untreatable.

In conclusion, I think we need to address the issue of major organisations like Rio Tinto going global and having to attract or to make sure that the research and technology for those organisations remains in Australia. I think we have to make sure that the organisations that do the long-term research, like CSIRO and the universities, are very well supported. We also have to recognise that mining, whilst, as the previous speaker said, we are users of technology to a large degree, at the same time there is more than most people realise done in the research and development area.

CHAIR—I wish to ask you about your international links and what your company's policy is on research and development and new product development in terms of your international alliances, whether the company has a policy of developing and choosing new and innovative products from other parts of the world rather than doing the research and development in Australia.

Mr Brownscombe—In terms of choosing other technologies, the policy is that if the technology is available then we sure do not want to reinvent it. We would be happy, in most instances, to purchase technology that is available in the market place. The only time that we want to develop our own technology and lock it up as it were is if that provides us with real commercial advantage.

If the technology is coming in in the form of, for example, locomotives, we are happy to work with the supplier of the locomotives to provide a locomotive of sufficient capability to satisfy our needs. Usually, that requires some adapt and adopt process certainly involving technology. If we are looking at something like the high smelt process where real competitive advantage will be gained by locking up this technology, Rio Tinto is prepared to put in the research funds to do that work. I am not sure whether that answers your question.

CHAIR—I think you were present when one of the earlier witnesses made mention of the attitude by some mining companies to perhaps buy innovative technology rather than doing the development here in Australia. I just wonder what your response to that is. You have given me a bit of an outline. But, obviously, with international links you are not going to double up on research that is already being undertaken in another country that might add to your own research here. I want to pursue a slightly different line now regarding the taxation incentives which you alluded to with the change from 150 per cent to 125 per cent. Have you had the opportunity to look at the latest changes that have been introduced by the government on R&D Start? What is your view of the changes that have been made?

Mr Brownscombe—I have looked at it briefly, but at this stage there is no publication, no literature—or not to my knowledge—that outlines the enhancements of the original Start program in any detail. I am not familiar with the detail of the changes. I do understand that an organisation like Rio Tinto, in some instances, will be able to take advantage of the Start program but that there are other restraints there, such as having to put forward the proposal and then waiting for it to be approved, which has left me with some concern. If the process becomes bureaucratic then it becomes very difficult for quick decisions to be made and for the research to be done quickly.

Mr BEDDALL—Let us go to high smelt because I think it is a very good example—and I have seen the process—of how Rio Tinto's work with CSIRO is well within its own research capacity. It arose out of the fact that you had a large ore body that was to be utilised and the ore body was not suitable for blast furnace so you had to go to the next generation, and high smelt is probably two generations ahead of the technology that was available. How close is it to fruition? This is not tens of millions of dollars, is it?

Mr Brownscombe—No, it is hundreds of millions. Very recently a decision was taken to go ahead with a—I need to be careful with the language here—plant which is certainly a production sized plant. That gets into the several hundreds of millions of expenditure and then ultimately to go to the full scale plant. I guess we are cautious as an organisation with that sort of technology because the risks are very high.

Mr BEDDALL—Because CRA/Rio Tinto has never done a research project of this size before, has it?

Mr Brownscombe—No. There have been projects that may have eventuated had they continued, but this one is the one that looks like going through to conclusion—very high probability.

Mr BEDDALL—The great irony is that they closed down BHP steel plant.

Mr Brownscombe—Yes. But it certainly arose out of the fact that the Tom Price ore body is well through its life—and that is well known—and avenues for using the

lower grade materials, to which Hamersley has access. When the opportunity arose, addressing the problem through a technology approach was the one that was decided on.

Ms GAMBARO—We have a submission next by the Australian Mineral Industries Research Association. One of the things they are advocating is that there be a significant benefit to mining companies if they are able to write off their capital expenditure on prototypes and research facilities. I would not mind if you commented on that. Do you think the definition of ‘eligible R&D’ in the current tax act is perhaps too narrow?

Mr Brownscombe—I will take the second one first. The definition now appears to Rio Tinto to be about right. Rio Tinto was always concerned with the old definition about the growing use of syndication. So the changes were welcomed because Rio Tinto wanted to see that this was a credible approach in the eyes of government and the Australian people and could be supported in the long term, because after all that is the key part of it—being able to depend on the R&D concession over the long term. We were, of course, disappointed about the 25 versus 50, but that is another story.

As far as prototypes go, any assistance in the area of R&D helps. Where it most often helps is being able to show the people who approve funds in our organisation that there is not just support from within the organisation to do it and justification but that research is being supported by government and is being done by others in the industry.

Ms GAMBARO—I have representations, as has Mr O’Connor, of people who come to me with innovative ideas. The previous speaker alluded to this. What role do you see, apart from individuals of high wealth that are willing to risk their money with such ventures, private investment banks playing in this? How can we encourage them to be more involved in R&D investment?

Mr Brownscombe—That is actually taking me out of the mining area. In the mining area we are not too much interested in developing and commercialising technology.

Ms GAMBARO—Unless it is for your immediate use?

Mr Brownscombe—Yes, that is right. We are happy to develop it and then use it, but to actually go out and sell the technology is something that we have extremely little experience in doing. I would like to see encouragement to the venture capitalists—and I say this personally—to support the sort of thing that you are doing. I have not given consideration to the ways that you would do that.

Ms GAMBARO—I appreciate that.

Mr O’CONNOR—I just extend that point. Your company has an enormous purchasing power in the market place. What sort of incentive would you need as a

company to encourage you to evaluate Australian technologies and use your purchasing power in that development phase?

Mr Brownscombe—I do not know that we would need a lot. We are doing that now. We would also want to be very careful that we were not actually getting government subsidies to do that. Apart from that, I could not comment.

Mr O'CONNOR—To what extent do you fund to get your long-term research done through Australian universities? Are you a user of the Australian universities?

Mr Brownscombe—To some extent. It is usually when the Australian university comes to us with an idea, although there are occasions when we will choose the university that we think has the greatest skills for the issue that we are facing and take the research to them.

Mr O'CONNOR—You argue fairly strongly for the restoration of the 150 per cent tax concession.

Mr Brownscombe—Yes, we do. The main difference that I have noticed in the role that I play is the fact that it is no longer something that I can take along when I am trying to justify research and use to argue the case.

Mr O'CONNOR—This is to your bean counters?

Mr Brownscombe—Not the bean counters so much but the senior officers in the organisation who actually approve the money. The long and the short of it is that the administrative cost have increased a little. The total level has come down. It starts to enter the area of 'Gee, is it really worth worrying about this?' because it is just an administrative hassle for little return.

CHAIR—Thank you very much for your input into today's proceedings. Obviously, the government has not solved its message about the R&D Start yet.

Mr BEDDALL—Maybe it has.

CHAIR—I do not think it has based on the comments that you made. I appreciate the time and effort that you have made today in giving evidence to the committee.

[11.17 a.m.]

DAVIES, Mr Richard Anthony Hartley, Chief Executive Officer, Australian Minerals Industries Research Association Ltd., Level 9, 128 Exhibition Street, Melbourne, Victoria 3000

EAGER, Mr Michael Andrew, Senior Vice Chairman of Council, Australian Minerals Industries Research Association Ltd., Level 9, 128 Exhibition Street, Melbourne, Victoria 3000

CHAIR—I welcome the representatives from the Australian Minerals Industries Research Association Ltd. I remind you that the proceedings here today are legal proceedings of the parliament and warrant the same respect as proceedings in the House. A deliberate misleading of the committee may be regarded as a contempt of the parliament. The committee prefers that all evidence be given in public but should you at any stage wish to give evidence in private, you may ask to do so and the committee will consider your request. Would you like to make an opening statement before we proceed to questions?

Mr Davies—Yes, thank you. We have, as you know, submitted a letter and a short report, which you have obviously read. I would just like to make a number of points covering some of the ground in there. There are one or two issues which we did not emphasise in the report which I would also like to mention. The first thing is the question of time frames. The time frame for research and development is very much longer than the time frame for the business cycle, which in itself is longer than the political cycle. I think that there is an aspect that decision makers need to take into account.

These long time frames make it very difficult to assess the benefits of R&D and the benefits of government programs to assist R&D over a shorter period. The first point is that constant chopping and changing of projects and procedures makes it very difficult to continue on in that kind of environment. We just make the point that any changes to the system, whether it be to the R&D tax act or the support schemes or the way that research is organised should be done very circumspectly and with that in mind.

Secondly, I would like to make the point that R&D and the minerals industry is incremental rather than breakthrough. Occasionally there are breakthrough developments; you talked about HIsmelt earlier, which is very innovative. But most of the stuff is productivity gains, which is giving two or three per cent, which is incredibly important in the level of productivity when you are looking at the size of the mineral exports.

Nevertheless, although these gains are incremental, it does depend on world-class R&D. I would emphasise that the R&D which Australia has in the mineral, exploration, processing, engineering and environmental areas, et cetera, is world class and it is a source of great comparative advantage for Australia. It is something which can be overlooked,

because the minerals industry tends to be taken for granted. This as an area where we do have a good track record.

Thirdly, we support the reintroduction of the 150 per cent tax concession and also the restoration of section 73A of the tax act in terms of the eligibility criteria for R&D. We also very much support the cooperative research centre program. There is one aspect of that program that we would like to emphasise. This is the educational linkages. If you like, the CRCs create an umbrella within which industry research and fundamental research can coexist. People who normally would not be exposed to industry are exposed to industry and as a result they are in a position to transfer technology to the industry when they ultimately get jobs. People might not originally have thought of moving but the cooperative research program enables them do that. We think that is a very important aspect of the program. It is rather understated.

We also think in relation to the CRC program that it is a bit disingenuous to claim, as the Mortimer report did, that because the CRCs have now been around for a few years, people will be aware of the benefits of collaboration and will automatically collaborate. AMIRA has been around since 1959. We are a totally private sector industry funded organisation. We exist in order to bring the research community together. They do not do this naturally. In the minerals industry anyway that has been AMIRA's role.

We have articulated what we see as our principles for CRCs. When I say we, these are the senior executive directors and senior technical managers in the industry who sit on the CRC boards either in a chairman capacity on the board or the technical advisory committees. We have articulated seven critical success factors, which are included in the notes in the appendices, to make the CRCs work. That is based on practical experience.

We support the R&D corporation model. We were very disappointed that the ERDC disappeared. We did have successful projects with the ERDC. One of them has been commercialised. That was an oil and gas meter which CSIRO had developed. We were involved with the ERDC on that. It was a very significant development.

We also support the Australian Research Council collaborative grants schemes. We certainly encourage this and any other collaborative grant schemes. We would like to see them responsive to industry. My feeling is that they tend to establish their own bureaucratic process and wish the industry to fit in with their process rather than looking at what is already happening and acknowledging how industry works and assisting us in that way.

With regard to the new R&D start scheme, we will certainly make use of it where appropriate. We are looking to see how it applies to some of our potential projects and existing projects. We do consider it essentially a regressive substitute for the 150 per cent tax concession. It does involve more bureaucracy. It is more of a pick a winner scheme. It is not clear what the process of selection is. It is not correct to compare it in terms of the

150 per cent tax concession. In the document that was produced there were various levels of comparison that the Start premium was equivalent to 189 per cent or something like that. That is an incorrect comparison because there is no comparison between a generally available tax concession which anyone can apply for and basically a pick a winner scheme which is based on a bureaucratic process and a technical committee.

A point that we did not make in the submission is that the emphasis on external earnings for individual research institutions is actively discouraging collaboration. You know that CSIRO has a specific target of 30 per cent. It has been suggested that universities should have a similar target. AMIRA members are continually arguing that researchers should work together. If you have the best person in the world in CSIRO and the best person in the world in a university, we want those two guys to get together and work, particularly in AMIRA projects at the pre-competitive collaborative area where we can do that.

The problem is that the external earning pressure is forcing people to look after their own patch. They are tending to say, 'Look, we can develop a one stop shop.' Australia is too small to allow that level of indulgence.

The research institutes catering to the minerals industries do have a very high level of external earnings. I think it should be recognised that those external earnings are real external earnings in that they are all private sector funding. They do not have the same level of external earnings which comes from the public sector as you find in some of the other areas. As an example, the CSIRO division of minerals has 45 per cent of its funding externally—most of it from the minerals industry and the Julius Kruttschnitt Mineral Research Centre at the University of Queensland has 95 per cent of its funding from industry, so it is possible.

Another point that we did not make in the submission was in terms of looking at the economic debate and public policy over the last years. It seems to me that there is a great divide that is opening between the economics profession and the engineering profession. They do not seem to be able to talk to each other. We have had some discussion in AMIRA of the engineering view of the world, which is slightly different from the economic view of the world. They seem to be talking past each other rather than to each other and with each other. I think it is essential that in defining public policy in relation to R&D, all of the disciplines—engineering, technical and scientific—should be equal partners in the debate.

Finally, we have not addressed the fifth and sixth terms of reference in your review, which deal with the skill base in education and training opportunities. The minerals council has just completed a review of this. They are launching it on Monday. I gather that they have sent your committee a number of copies. If they have not arrived, they will arrive. That is all I have to say in terms of preliminary remarks.

Mr Eager—I wish to make a couple of short comments in amplification of what Mr Davies has said. He did make the point that much of the R&D in our industry is incremental rather than fundamental breakthrough work. That, nonetheless, is extremely important. I think a previous witness had said that that work would be done in any event, but in our industry the outcomes of even what appear to be quite minor incremental R&D can have very significant economic benefits and normally require very substantial capital investments. I just ask that you be well aware that incremental R&D should not be viewed in the pejorative sense of the word.

Again, in relation to a comment that an earlier witness made that the mining industry is very technological, I would like to give a couple of examples to set the scene for that. It would be almost impossible to find even the smallest mine site in the country without several highly qualified scientists on that mine site all the time. We are not an industry of truck drivers and labourers. As you move to the bigger mine sites, it is very common to find people with postgraduate qualifications in science and engineering all day every day working very intensively in those fields to improve performance to make the industry generally and their particular organisations more competitive. That tends to be generally in that incremental field. I use that as another measure of how important that field is.

CHAIR—Thank you for those comments. I have noticed in your submission that you stated there is a decline in R&D overseas industries allied to your field. You also make comments about AMIRA stating its guiding principle as industry leads and government follows. Where are you leading us in grasping these opportunities of declining R&D overseas?

Mr Davies—I guess the industry is going global. AMIRA is going global as a result of that. I guess the leadership in that direction is in grasping the opportunities where they arise. Previously we regarded Australia as being our oyster; now the world is our oyster and we are looking to become a global organisation.

CHAIR—Are we having any success?

Mr Davies—Yes.

CHAIR—Can you give us an illustration.

Mr Davies—Our largest project is really a program that has been running for 35 years and reinvents itself every three or four years. It is called the mineral processing project. It has 29 sponsors at the moment, six of these are in South Africa and part of the research work is actually done in South Africa as well. Only this week we have been talking about bringing another 12 sponsors from South Africa into that project. We have identified that as one of the areas where we will expand on a global basis and, if you like, bring them into the global community on that particular development. The benefits will be

that there will be interaction between the South African laboratories and the Australian laboratories which are involved and it will expand the knowledge base in Australia as well.

Mr BEDDALL—Coming back to the 150 per cent R&D component, because it is something I think is important, I am interested to see how you are trying to get that restored. The reality of the 150 per cent R&D is that Treasury has rolled out every day since it was introduced a submission to knock it off. Every science minister, until the last one, has resisted that in the budget process. You do not have to convince mining ministers or science ministers that it is a good thing; it is the bean counters at Treasury who say, 'We'd rather give you \$200 million cash than an open ended tax concession because we can't quantify it.' How do you go about changing that mind-set? Is that really what you are up against, a mind-set about quantifying three years out what it is going to cost? It does not matter if it works or not, they do not care.

Mr Davies—I guess I understand exactly what you are talking about there. I guess that comes back to the last point of trying to get the engineering profession more involved in the policy debate and emphasising, as Mike did earlier, the importance of this to the general economy. Perhaps Mike might want to enlarge on that.

Mr Eager—I think also it is worth remembering, whether it is 125 or 150 or even 200, it is only of benefit to those companies with the prospect of paying tax. If they have the prospect of paying tax, they are obviously profitable, they are looking for ways to become even more profitable and the return from successful R&D will reflect back into Treasury sooner rather than later. That is what is forgotten. We look at this in isolation, in which tax years stand alone, without looking at the downstream consequences.

Mr BEDDALL—But they cannot put that in their forward estimates.

Mr Eager—They cannot; neither can we because we cannot be certain of the outcome of R&D. On balance, R&D would not have survived as an approach to improving business unless on balance it did give returns. The parallel in our industry is that exploration only survives because on balance it gives returns, notwithstanding that in many areas it is an abject failure for many corporations. But on balance the economic returns are there.

Mr RICHARD EVANS—I have a question out of left field. I was thinking about what you said before about bringing these two guys in. Is there much participation in the industry by women?

Mr Eager—The minerals industry has one of the lower participation rates of women. Currently, the professional institute, which represents most of the professionals, the Australasian Institute of Mining and Metallurgy, has a women in mining task force which is looking at that and surveying the attitudes of women who are employed in the

industry and surveying the attitudes of women who are not but potentially could be. That is progressing. We expect to have reports from that later this year.

The presence of women in the industry is most marked in the professional support areas in the roles of, for example, mining, engineering, geologists, metallurgical engineering and those sorts of roles. I guess that is where we have been most successful in encouraging, certainly, equal opportunity without gender bias. We take affirmative action and make sure that the very subtle indirect discriminants, as much as we are able to, are removed as soon as we are able to remove them. Hopefully we will eliminate them all in time. I do not deny that there are still very subtle and not so subtle discriminants in there and the perception of what is man's work and what is not and so on.

All of those are being addressed. I guess the higher profile occurrences or the situations that arise in the minerals industry are those, for example, of women in the traditionally male, semi-skilled side of training—truck driving and so on—and the unfortunate catastrophic instance of, for instance, a few weeks ago of a woman equipment operator being killed in an underground mining accident. But, I guess, to answer your question, the mining industry is generally doing a great deal to encourage the presence of women. Progress is not rapid, but we are encouraged by the progress we are making.

Mr RICHARD EVANS—We heard evidence early this morning about work opportunities for people who are graduating and that they are diminishing. The obvious logic to that is that it is not good for the industry to have diminishing work opportunity. Does that make it more competitive and, therefore, the work produced becomes better?

Mr Eager—It certainly is competitive. Each employer within the industry—and bearing in mind that the industry generally, as it is categorised, is 95 per cent in the private sector; so it is a very competitive business—is always looking for the cream of the crop. The university selection procedures and the fact that the people we are looking for have chosen a vocationally oriented area of study means that it is a very high average anyway. The industry is seeing a very high average of university output.

It is cyclic at the moment, of course. The industry is bedevilled by low commodity prices and uncertain markets in Asia and elsewhere. That is having an impact on the exploration area which has an impact on recruitment into that area. That is the obvious short-term reaction. But over time that tends to balance out. We have been through periods where it has been very difficult to find adequate employment. In fact, many companies have recruited from overseas when the Australian supply of graduates has been inadequate.

Mr BEDDALL—It was told to me some time ago by a very senior mining executive that there were certain courses in certain universities in Australia where the quality was so poor that they would not employ graduates. This was a person I had no reason to doubt. What are you doing to address those problems?

Mr Eager—Part of that is being addressed by the report of the Minerals Council of Australia, which will be released on Monday. I suspect that comment was largely in respect of education in geology or geoscience disciplines because there continues to be—

Mr BEDDALL—It was in mining engineering as well.

Mr Eager—There continues to be a plethora. The industry generally supports the view that a successful university will have a significant research component to its activities. It will not just be an undergraduate vocational trainer; it will be a wider vocational educator as well as a significant researcher. That then tends to push the industry in supporting graduates from those institutions which have a significant research component. By that very nature, they tend to have a closer liaison with industry. I think that response you had is not unusual. Most within the industry would say that, individual student abilities aside, we still have preferences for some institutions over others.

CHAIR—Thank you for those comments. Coming from Bendigo, a goldmining centre of Australia, I have an interest in what you have just said. I ask you finally whether you made a submission to the review of the tax concessions that is being conducted by the Department of Industry, Science and Technology? Have you made a submission to that?

Mr Davies—We are about to. We have a problem with it. I first saw an advertisement for this on 11 February and the closing date for submissions is 27 February. The Minerals Council taxation committee, which is headed by Peter Robinson from BHP, had no knowledge of this committee until I notified them of it. They are now looking at the documentation. In this we worked very closely with the Minerals Council. AMIRA would not put forward a taxation position which was different from the Minerals Council, but we certainly will support it on the elements of R&D we were able to give some specialist advice. Their advice to date has been to reintroduce the section 73A. After reading the documentation, that advice may be modified or added to. We will certainly be responding to it. I would make the point that, for the taxation committee to get a considered response from all of its members, there is not exactly a lot of time to circulate the document. I suspect they will be looking for an extension.

CHAIR—At the appropriate time, perhaps you could consider making a copy of that submission available to this committee.

Mr Davies—Certainly.

CHAIR—Thank you very much for your attendance this morning and for your responses to the questions.

[11.43 p.m.]

NOSSAL, Sir Gustav, President, Australian Academy of Science, GPO Box 783, Canberra City, Australian Capital Territory 2601

CHAIR—I now call on the Australian Academy of Science to give evidence. Welcome and thank you for attending this morning. I remind you that the proceedings here today are legal proceedings of the parliament and warrant the same respect as proceedings in the House. Deliberate misleading of the committee may be regarded as a contempt of the parliament. The committee prefers that all evidence be given in public, but should you at any stage wish to give evidence in private, you may ask to do so and the committee will give consideration to your request. Thank you for giving up your valuable time to be with us this morning. Would you like to make an opening statement?

Sir Gustav Nossal—It is obviously a privilege to have the chance of testifying before this most important committee, the work of which the Australian Academy of Science is regarding with considerable interest. There is a mantra oft repeated in Australia that says something to the following effect: that, over the last 70 or 80 years, this nation has been very successful in research, in innovation, in new ideas, but somehow has failed to exploit this excellence at the 'R' end of the R&D spectrum to the economic benefit of the nation.

My very dear colleagues of the Australian Academy of Technological Sciences and Engineering who have appeared before you earlier today, and with whom we work in the closest concert, will have concentrated their submission on the more applied end of the R&D spectrum. So, with your indulgence, I would like to make a very few remarks about the more basic end of the research spectrum—that type of work which goes on in universities and research institutes.

The first thing I would say is that, over the last 10 years, the change in that paradigm which I have enunciated—largely as a result of government policy, I might add—has been profound. I believe that the academic sector is now recognising its responsibilities to the Australian community with respect to the economic, social and environmental fruits of the research much more seriously. That is the first thing I want to say: there has been a change, and that change is not yet fully appreciated by decision makers in this country.

The second thing I would say stems from a recent conversation with Sir Robert May. Sir Robert May is an Aussie; he happens to be the chief scientist of the United Kingdom. During a recent visit he said to me, 'Gus, I don't understand why you have so much difficulty selling university based research.' He said, 'I fight a lot of battles in Whitehall; but the one thing that is never questioned wherever I move in Whitehall is the science base of the United Kingdom'—the fundamental science base, the work that is going on in the universities and research institutes.

My belief is that these clarion calls for ‘more relevance in research,’ ‘more application,’ ‘more short-term tactical research,’ which the academy has backed and of which the academy has been a part, are now in danger of going a bit too far. My contention is that the science base of the nation needs constant nurturing and cannot be pushed to one side with the attitude, ‘Oh well, we’ve done that, we’ve done the ‘R’; its time now to concentrate on the ‘D’.’ Other nations are not standing still. The cutting edge of basic science, which is the crucible from which all of the applied discoveries flow, must require constant nurturing.

Let us have a look at a few of the ‘attacks’ in recent years. We have already commented extensively on the 150 per cent going down to 125 per cent. That, of course, has made companies who would subcontract research to universities and research institutes look more warily at the expenditure of their dollar.

We have seen a brilliant movement, the Cooperative Research Centres movement, coming forward in this country but thoughtlessly under attack by Mortimer. Fortunately, we hope that that will be alright or at least that the CRC movement will survive. That movement has been part of the sea change of which I speak. An entirely new cadre of research scientist is being forged by the CRCs: PhDs comfortable at both sides of the fence, the academic side and the industry side, eagerly finding jobs within industry. But here we find this relatively new initiative only five years into its life already under attack by the economic rationalists.

The university general budgets: you will say that Senator Vanstone’s cuts were not incredibly severe. They were five per cent over a three-year period. That is not a huge cut, you might say. But in that regard, please remember two things.

Firstly, there had been a long, long postponed industry-wide pay increase in the pipeline when those decisions were made. That industry-wide pay increase now has to be worn by the universities, and there is no other way of solving it because in all previous history those industry-wide pay increases have automatically gone into the tertiary education commission’s formula. Now that is no longer the case, and universities have to wear it.

The second big thing about university funding that has to be remembered is that all of the newer universities are now seeking to upgrade their overall level. And would you believe that, since the Dawkins’s amalgamations and the Dawkins’s introduction of the unified national system, there are exactly twice as many postgraduate students as before—exactly twice. Yes, from that base, university funding has gone up just a little bit. But please look at the figures for government expenditure per unit student where the graph is relentlessly down, and please look also at the staff-student ratios where the trend is relentlessly down—a very big problem of morale in universities and an erosion of standards in universities, particularly in the research oriented ones.

I am nearly done, but I would make basically three more remarks. The chief agents for the support of university research are the Australian Research Council, which comes under DEETYA, and the National Health and Medical Research Council, which comes under the department of health. The ARC budgets—let me commend successive governments—have risen modestly; there is no doubt about that. But, once again, the numerator rises but the denominator rises by a very much bigger factor.

All of these new graduate students: who is going to supervise them? They are all doing research. They have been enjoined because of the Dawkins's amalgamations, and now think of themselves as members of a collegium of researchers, which is what a university is. The pressure in the system is enormous. The success rate in ARC large grants competitions is now 20 per cent, which is the lowest in history.

The NHMRC: here is a real lulu. Successive governments have increased the appropriation to the NHMRC from a very, very low base, modestly but consistently. But guess what? Someone who is responsible for the forward estimates has not built these both Labor Party and coalition mandated increases into the base. They have all had some kind of a sunset clause associated with them. So the system now faces the probability of a 25 per cent cut which, of course, will not happen, because the lobby will scream so loudly that the voters will come scuttling out of their suburban houses and will ensure that it will not happen. But I can just see the headline now—'Government announces 20 per cent increase in medical research funding' which will be a restoration of four-fifths of the cuts. These are the kinds of problems that we face at the more basic end.

Distilling all of that, let me tell you my gravest fear. My gravest fear is for the young scientists. My gravest fear is for those under-35-year-olds with their foot on the bottom rung of the ladder of success. Contrast the brilliant career opportunities that faced Gus Nossal when he was 25 or 35, when there was never a shortage of jobs, when the one thing we never thought about was whether we would get a job. Yes, grants were always tight and always competitive, but not as competitive as today.

The young researchers of today have very few university openings open to them. Most of the ones that are open are of limited tenure. When they do get, let us say, a fixed term lectureship for a two- or three-year period and now want to do research, they enter the NHMRC or the ARC competition and, of course, in a '20 per cent will succeed, 80 per cent will fail' type of environment, they are up against their own teachers and mentors. Their success rate as a group of 35-year-olds is much lower than the 20 per cent of the overall success rate. The academy has argued for a long time that the ARC should quarantine some of its funding for the younger workers—as indeed, to its credit, the NHMRC has done with its R. D. Wright fellowship schemes and a few others.

The clever country is something that we should be very proud of. We still have a wonderful science system in this nation. The science system has been moving in the government's direction of making itself more relevant to industry, commerce, the rural

sector and the environmental sector. There are danger signals telling me that the trend may be going too far, and somebody had better have a weather eye out for the university base and the research institute base.

CHAIR—Thank you very much for your comments. I had a read of your submission and I was very interested in one particular section—and you have gone to the very heart of that right at the outset with your comments to us. The part to which I want to refer is ‘articles in the daily press suggest that a confidential survey by the Department of Industry Science and Tourism is showing that the level of R&D activity has been severely affected as a result of these changes’—and you spoke to that very point. I wonder how much other knowledge you have of that confidential report.

Sir Gustav Nossal—I do not. I have what you could describe, I think, as a semi-leak. But I think it is very wide scuttlebutt that the next lot of figures, which will reflect the change from the 150 to the 125, will show a marked drop in industrial R&D; and a marked proportion of that marked drop will reflect on CSIRO, the universities and the CRCs because, of course, to the degree that some of that research is being outsourced from industry to these institutions, it must be affected. But no, I cannot give you any real accurate figures.

CHAIR—That leads me on to the next question. That is: is it only about money, or are there other factors involved in the proposition that you are putting forward?

Sir Gustav Nossal—The rhetoric of both government and opposition about science and R&D is good—the rhetoric is good. If you read the speeches of the Prime Minister, for example, given on the evening that he spent nearly a full evening till 11 or half past 11 at night at the Australia prize ceremonies, the rhetoric is good. He recently opened the new Garvan Institute in Sydney and referred to medical researchers as being among Australia’s national treasures, or words to that effect.

So I do not think there is any problem in the rhetoric. We sometimes wish that the financial flows were more in tune with the rhetoric. But my belief is that the central problem lies in a bureaucracy so steeped in economic rationalism as an ideology that there is no serious contrasting voice heard in the corridors of power. The prevailing orthodoxy is that we have to privatise everything, we have to have fiscal rectitude, we must be a low tax country—an aspect which I do not understand: why Australia should be the lowest tax country in the OECD, with all of the enormous development prospects that face this nation. Of course, I am not going to get elected to office by preaching higher taxes, I know that.

But as for this view of the bureaucracy that basically all spending is bad: do you know what I call it? I call it democracy fatigue. I think there is such a prevalent view in the bureaucracy that governments are likely to get it wrong and to frigate it up that, therefore, we do the best job for Australia by governments being allowed to do nothing. It

is a very prevalent view. Those people in the Treasury, Finance and, to a lesser degree, PM&C are very, very powerful. So, if you ask me where the problem is, I think that is very close to the root of the problem.

I will go on and refer to this multitude of inquiries that we have had. If you cast your mind back over the last three or four years, there has been the big R&D review by the Industry Commission which, by the way, turned out to be very good in support of universities and very good in terms of externalities of the research process. So that was one we worried about more than we really had to. Then there have been the Mortimer report, the Goldsworthy report, the Stocker report, the West report and these many, many reports, to all of which we have made submissions. They cause anxiety. The university community is saying, 'Here comes another one; are they having another go at us?'

The fact of the matter is—and I hate to have to tell you this, because I am an optimistic person and I have a tremendous belief in this country and in the young people—that the atmosphere and morale in universities is low. It is the tremendous pressure that has come from this relentless increase in the student to staff ratio, and the relentless increase in the competitiveness of the granting system occasioned by us essentially having twice as many universities as we had before.

CHAIR—How do you respond to the Mortimer report and the call for the reduction in public funding, based on the premise that arrangements for CRCs fund institutions rather than research activities; is that valid?

Sir Gustav Nossal—I think it is a total nonsense. The fact of the matter is that the CRCs are not in the strictest sense institutions; they are virtual institutes. There is very little in the way of bricks and mortar about them. There is no thought or concept of institutionalising the 63 or 64 CRCs; in fact, some have already and correctly been terminated. There is going to be great dynamism in the system.

You have a new initiative. It is five years old. It has already been many times reviewed. The Myer review, conducted for three years into the program, was very, very favourable. Mortimer has a 1½ page throwaway line, which clearly shows that he did not understand what CRCs were about. I hope that the Mercer/Myers Stocker review—which is, I think, either completed or near completion but the government has not responded to it yet—will highlight what a good job the CRCs are doing. Five years is a short time in a research exercise.

It is, of course, true that industry is getting benefits from these CRCs in as much as there is public money going into research which is, to a large extent, slanted towards industrial exploitation—except for those CRCs that are public good CRCs, which Mortimer wanted to retain anyway. But the point is this: it is a tough, competitive, borderless, deregulated world. The support of R&D is one of the few World Trade Organisation approvable industry support mechanisms that we still have left—and, believe

me, every country is utilising it. In fact, our Asian neighbours, prior to their meltdown anyway, were falling all over themselves to support R&D, including the basic R&D in universities.

The minister for science in Korea—and it may not be the most apposite time to relate this anecdote—was in Canberra on the day that Peter McGauran fell on his sword. Peter conducted himself with incredible dignity in being the host on a very high profile occasion in Parliament House, at which I was privileged to attend, where a friendship treaty was signed between Australia and Korea in R&D terms. Do you know what that chap said to the assembled dignitaries? He said that the Korean government has passed into law a commitment to increase government spending on R&D from three per cent of our budget—which he said was a low base—to five per cent. And he said—and, of course, I have not checked this as to sources—that that law would not be able to be rescinded for five years. That is the kind of commitment that Korea has made to R&D.

At the moment, we are the envy of these countries. They turn to us for the more basic sciences. That is very true in Indonesia, it is less true but reasonably true of Malaysia, and certainly it has elements of truth in Korea.

Now of course things have happened up there that may change some of their perceptions but I think that our R&D is a precious bargaining chip in our negotiations with these countries. It is one of the best things in APEC. The APEC science ministers meetings have been brilliant and there are a lot of good things happening by way of collaboration, which would be imperilled if the economic rationalism went too far.

CHAIR—Over the past years a number of public utilities and organisations have been broken up or corporatised or privatised. There is an amount of intellectual property and data available within those areas, or had been. Do you think that the educational institutions and industry has had sufficient access or availability of that intellectual property?

Sir Gustav Nossal—That is a very interesting question, and I will respond to it in two ways. Telstra has seen an amazing change in its overall research ethos, which has become considerably more applications oriented and considerably more thrusting but has been accompanied by increased resources. In the information communications technologies, I am not able to tell you how much of it is being outsourced and therefore whether there has been a problem with universities and access. I do not think there has.

In the case of CSL, which was formerly the Commonwealth Serum Laboratories and is now a fully privatised vaccine manufacturer and blood products company, the increase in R&D has been remarkable since privatisation. Most of that is in-house; a proportion of it goes via CRCs. I think you will find the academic sector reacting very warmly to this new thrust in CSL which has become quite a power in the land. It was not before under the government's aegis. I think the privatisations on the whole have been

okay from the point of the view of the academic sector.

CHAIR—Thank you for your comments on that. We may be able to approach them and have them appear before the committee.

Mr O'CONNOR—Would you comment on the effectiveness of the R&D Start program. You seem to suggest that it is less effective.

Sir Gustav Nossal—The academy has consistently said that the 150 per cent, with its lesser need for paperwork in competition, would be preferable as a general point to the Start program. That being said, given that we lost that battle, putting it bluntly, the Start program was good. I think a lot needs to be seen in the effluxion of time as to how it actually works. We think the IIFs are very good.

We welcome John Moore's statement that there will be two or three more and there will be a little more money behind that. We think the R&D grants are good. We welcome the fact that there has been a capacity for the larger companies also to benefit from Start. We did not see any reason why they should not be able to achieve a benefit.

But I think the main thing that the committee should note is that the scale of these initiatives is very modest in overall terms. Please go to the minister's very lovely and high profile statement called 'Investing for growth'. Please go to the back page and look at the dollar figures. That is where you get the real truth. The fact of the matter is that both Mortimer and that document actually end up taking money out of R&D. The total sums expended are lower than they would have been had previous policies been left in place. That of course can be very cleverly papered over by rhetoric. I now go over the rhetoric fairly cursorily and go very quickly to those back pages which tell the story of how much money is being appropriated.

Ms GAMBARO—There are a few things I would like to run with you. I refer to the Mortimer report and the single entry point for R&D as having a single unit and that that be established and rural R&D corporations being merged. What are your viewpoints on having a single point reference?

Sir Gustav Nossal—We saw some very real problems with that because the different sectors of the R&D spectrum have a variable capacity to respond to change. I will tell you one fairly specific area that has me terrified. We have a very good division of CSIRO devoted to wool technology in Geelong. It is a very practical place. It is a place populated mainly by older people. It has been around for a long time. They are very savvy. They are improving the nature of Australian wool.

They are finding out new ways of scouring, they are finding new ways of creating tops and new ways of combing. They are creating finer wools for lighter apparel, particularly for women. They are doing wonderful work. When the wool price plunged—

the whole thing was tied up with the wool price—there was relatively little that the chief executive of CSIRO could do to protect them because so much of their funding was coming via that wool levy. A fair number of people walked the plank. Yes, I am sure the CSIRO executive did as much as they could to moderate that.

If you go industry by industry, you are really better off having those industry's supports being thought about specifically for the industry. I can understand what Mortimer was getting at. He was worried about waste, overlap, special pleading and all of these things. On balance, I would sooner keep the schemes separate and make them extremely accountable and be prepared to be quite tough and to have competition rather than to merge them all into one.

Ms GAMBARO—Having worked in a university four years ago, I do not disagree with some of the things that you have said here today. It has been an ongoing problem. There are a few things I would like to run past you. You spoke of your early days as a student and going into research. There has been an increasing trend for people to do postgraduate degrees of various sorts and to increase their level of expertise. So the competition there has certainly increased. There are more demands in that area. At the Queensland University of Technology where I taught when the funding came around it was a perennial fight between some of my colleagues to make sure that they accessed some of that funding.

Are we losing a lot of our talented postgraduate students to overseas research facilities? Again, I speak from personal involvement here, particularly in space research. A member of the family recently returned from a three-year stint in Germany where he was quite well regarded in his field. What is the seepage factor of our postgraduate students?

Sir Gustav Nossal—There is an extremely interesting dynamic running here which bears close analysis. What you have is not exactly a brain drain but a brain circulation. There is no doubt that we lose top brains to the United States and to a lesser extent to the United Kingdom. There is equally absolutely no doubt that we have a net gain of brains from the United Kingdom. You only have to listen to the number of pommy accents in universities to know what I am talking about. I daresay that the United Kingdom gains brains from South Africa, Zimbabwe and probably India. So there is a brain circulation.

CHAIR—That is not such a bad thing.

Sir Gustav Nossal—It is not such a bad thing. Some of the Aussies who do find their way to Harvard, Oxford or Stanford make wonderful ambassadors to this country and set up little niduses where Australians get postgraduate training. That being said, I really believe in a brain circulation rather than a brain drain. I do worry about the fact that some of our best young talent is being lost. This is an elitist business but some of those very top brains like Peter Doherty, our recent Nobel Prize winner in medicine, in many ways would love to come back to Australia where the opportunities arise. There are a lot of young

people like that who would love to come back to Australia if only there were the job opportunities.

The difficulty is that at the basic science end—industry is beginning to absorb more of these people—unfortunately we are talking about a sector that depends on government, and government spending is unfashionable. So it is a very difficult area at the moment.

Let me tell you an amazing thing about the United States. The United States spends approximately \$25 billion a year on medical research. A total of \$12 billion of that is spent by the government through its so-called National Institute of Health. That is a body which has an intramural program. It has institutes a bit like the Australian National University, which is about 11 per cent. The other 89 per cent are poured out to universities. Guess what the Congress is doing? The Republican Congress, when everything else is being cut back, is getting steady six, seven eight per cent per annum increases in their funding because the American people believe in the clever country more than we do.

Mr RICHARD EVANS—You have mentioned the rhetoric of both parties. I guess the basic inference to be drawn from what you are saying is that the rhetoric is not matched with the action. I think we had the clever country statement in 1988, but has there been a slow move? I think the first minister for science was Barry Jones, and that was back in 1983 or thereabouts. Has there been a move, and is it still moving towards, establishing this priority for science?

Sir Gustav Nossal—Let me say that I think there is a genuine belief in both political parties that science and research are important—a genuine belief. Let me say as well that there is also somehow a genuine belief that this is as much industry's business as anybody else's. So, if only we could get industry to take up more of the slack, to pay for more of the bill, we would be okay.

I think this needs to be a partnership between government and industry. We are reasonably high up on the OECD ladder in terms of government expenditure on R&D; we are reasonably high up as a percentage of GDP. We all know that the industry part was lacking, and I am all in favour of the industry part coming up more. But I do not want it to go like this; I do not want it to be lessened government funding with increased industry funding. I would like the industry funding to go up steeply and the government funding to go up modestly, to create a good balance.

Mr RICHARD EVANS—Are you have identified, we are having inquiry after inquiry, and it is making the so-called industry a bit nervous. You have said that there has been a fundamental, I guess, lack of incentive for Department of Finance people to be really keen on science. What are we missing then? Are we missing an articulated policy, or what? What is missing in order to get these Finance people a bit more flexible with

science.

Sir Gustav Nossal—I will put it to you this way. I had some interesting interactions with Peter Cook when he was Minister for Industry Science and Technology. He had one of these big innovation statements coming on. He used to say to me, ‘Feed in ideas; put things into the government process,’ which we did. Once he said to me, ‘Gus, what you have to do is have yourself reported in the finance pages of the newspaper, then people will begin to take you seriously. If it is just in the news or the features pages, we up here are not really that interested.’ It was a very interesting point.

So I think, to a degree, we do have a battle for the mind-set of Collins Street. It would be good to get the titled gents of Collins Street and Pitt Street to take R&D more seriously—and I have done a lot of work to try to do that. Earlier today at this hearing you had Rio Tinto, who I think are very R&D minded. They have successfully conducted the largest experiment ever in Australia with their Hismelt process—and I do not know whether they had a change to tell you about that—very, very strongly promoted on the CRA board for a large number of years.

But, on the whole, there is a problem of perception. The problem is a bit like this: my image and that of my peer group in amongst the bureaucracy is of that self-indulgent twit who always has the hand out saying, ‘Give me, give me, give me.’ Of course, there is some truth in that. In every human conflict situation, there are elements of truth on both sides; and, yes, academics are very good at spending the public’s money.

But the fact of the matter is that those of the knowledge generation—which will be the springboard for the true innovations which will get us the next Peter Coleman influenza drug, the next Don Metcalf GCSF, the next cochlear implant, bionic ear—will all come from universities. In a sense, what is lacking is faith. I have used the words ‘democracy fatigue’; I might also say, a lack of a real faith in the capacity of the science system to create a greater nation, which I believe it actually does have.

Mr RICHARD EVANS—Would that be a problem culturally, though, with Australia—that we do not have that faith in those types of areas?

Sir Gustav Nossal—I think you may well be right, Mr Evans. But the fact of the matter is that history has shown that we can be pretty good at this stuff. Yes, there is a cultural problem.

Mr RICHARD EVANS—There is the combination though. I was just thinking, as you were speaking about universities: they are now trying to turn management into a science, and they are getting management into the levels of university development and education. Is there a case to combine some science into management courses?

Sir Gustav Nossal—Definitely. In general, one of the better trends has been these

combined courses: science-law; science-management; for that matter, if you want, arts-law. I think some of these combined courses are now very popular, and they are training out interesting graduates.

In my neck of the woods, the most interesting single experiment is this \$150 million experiment of the Cooperative Research Centres; that is where young people, from my side of the fence, if you want, are learning the lingo of business for the first time. We have not been very smart about this in the past; and, yes, I will freely admit that 15 years ago the universities were ivory towers—they were too much.

So I applaud the trends towards more application. All I want to ensure is that, having started the pendulum swinging, let us not let it swing too far. But you are quite right: there is a lot of science in management. And some of these combined courses are doing a good job.

CHAIR—Sir Gustav Nossal, thank you very much for your generous contribution of time and effort this morning. It has been very well received by the hearing, and we will certainly bear your comments in mind.

Sir Gustav Nossal—Thank you very much for your wonderful work, and I wish the committee very, very good luck.

Resolved (on motion by **Mr Richard Evans**):

That the Committee authorises publication, including publication on the parliamentary database, of the proof transcript of the evidence given before it at the public hearing this day.

Committee adjourned at 12.25 p.m.