COMMONWEALTH OF AUSTRALIA

Official Committee Hansard

HOUSE OF REPRESENTATIVES

STANDING COMMITTEE ON SCIENCE AND INNOVATION

Reference: Pathways to technological innovation

MONDAY, 12 SEPTEMBER 2005

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HOUSE OF REPRESENTATIVES

STANDING COMMITTEE ON SCIENCE AND INNOVATION

Monday, 12 September 2005

Members: Mr Georgiou *(Chair)*, Mr Quick *(Deputy Chair)*, Mr Hayes, Mr Jenkins, Dr Jensen, Miss Jackie Kelly, Mr Price, Mr Tollner, Mrs Vale and Dr Washer

Members in attendance: Mr Georgiou, Mr Hayes, Dr Jensen, Miss Jackie Kelly, Mr Tollner, Mrs Vale and Dr Washer

Terms of reference for the inquiry:

To inquire into and report on:

Australian technological innovation and pathways to commercialisation, with particular reference to examples of successful Australian technological innovations that demonstrate strategies to overcome potential impediments and factors determining success.

To assist in its inquiry, the Committee seeks to compile a series of case studies of successful technological innovations, and the pathways to commercialisation. Submissions are sought detailing successful examples of Australian technological innovations.

Submissions are also sought with particular reference to successful innovations, on issues such as:

- pathways to commercialisation;
- intellectual property and patents;
- skills and business knowledge;
- capital and risk investment;
- business and scientific regulatory issues;
- research and market linkages;
- factors determining success; and
- strategies in other countries that may be of instruction to Australia.

WITNESSES

Committee met at 4.43 pm

NORTHCOTT, Ms Suzanne June, Executive Director, Centre for Research Management and Policy, National Health and Medical Research Council

PETTIGREW, Professor Alan, Chief Executive Officer, National Health and Medical Research Council

CHAIR (Mr Georgiou)—I declare open this public hearing of the House of Representatives Standing Committee on Science and Innovation. The inquiry into pathways into technological innovation arose from a request from the Minister for Education, Science and Training, Brendan Nelson. Written submissions have been called for and, to date, 94 have been received. This is the eighth hearing for the inquiry. I welcome our first witnesses from the National Health and Medical Research Council. Thank you for your submission, which was very interesting. Although the committee does not require you to give evidence on oath, this is a proceeding of the parliament and deserves the respect that proceedings of the House would have. It is customary to remind witnesses that giving false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. Would you like to make an opening statement?

Prof. Pettigrew—Chair, I would be happy to summarise our submission as briefly as I can just to orientate our thinking. Can I say thank you to the committee and you for your invitation for us to appear before you. We are very happy to answer questions about our submission and to elaborate on points as you would like us to do that. Before doing that, I would like to bring to the attention of the committee the fact that the National Health and Medical Research Council is Australia's premier body for the awarding of funding for health and medical research in Australia. We have additional functions, which are to look at ethical issues with respect to health and medical research and to give advice to the community and to governments—state and territory governments as well as the Commonwealth government—on health issues. We are responsible for licensing research involving human embryos, through the Research Involving Human Embryos Act, and we have recently been given an extra principal committee through the government's processes to look at human genetics issues. That will be a new principal committee of the NHMRC.

Concentrating this afternoon on our research activities: most of our activities are directed towards the discovery end of the research continuum, but we also clearly have two related interests. One is an interest in commercialisation of that research where appropriate. The other concerns a very important issue—the translation of research discovery into improved health practice and health policy, which goes beyond just commercialisation, and it may not involve commercialisation at all, but can have significant economic benefit to the community and Australia generally. More specifically, we have introduced a number of funding schemes in recent years, particularly following the Wills review back in 1999, to improve our linkages between discovery research and commercialisation of research. That includes the introduction of development grants which are specifically targeted at proof of concept stage research. We have introduced a category of fellowships: a training fellowship related to industry experience which we have called the industry fellowship. In broad terms, it simply provides an opportunity for young researchers to spend two years in industry and then two years back in their academic institution so that there is a cross-fertilisation of experience, culture and work across those two boundaries.

We are increasingly recognising commercial outcomes of research in terms of the criteria by which further funding to researchers might be awarded. So when they report on their progress in their grant applications to us we assess that through peer review. Commercialisation is one of the criteria that we pay particular attention to. If they have been successful, they are rewarded in the assessment process for that. That applies to basically all forms of our research, particularly to project grant schemes and program grant schemes, which have different characteristics but the bulk of our research awards are in that. We have also jointly funded with Juvenile Diabetes Research Foundation International, which is based in the United States, a diabetes vaccine development centre, which is a research centre aimed at developing a vaccine for juvenile diabetes. Those are really far-end research activities that we are supporting.

Finally, through adjustments to our deeds of agreement that we establish between institutions that receive our funding and the Commonwealth, we have made it a stipulation in there that the institutions receiving our funding should have policies which are consistent with the national principles of intellectual property management which were developed by the NHMRC in conjunction with other organisations. So those institutions must be aware of those principles. We like them to abide by those principles so that they have procedures and processes in place within their institutions to capture IP and treat it appropriately in its further development and use. That is a quick summary of the major things that we have done.

You might want to hear from us a little about what the major issues are in this field at the moment. Very briefly in summary, I think there is a major issue around skills development and knowledge about commercialisation of research, particularly in the academic sector. The question in my mind is: whose role is it to do that education? It should perhaps be in part the NHMRC, but I would stress 'in part' because I think there are other bodies and authorities around who have skills that should be brought to bear in this. I would refer to the business community themselves as well as to the industry portfolio and the education portfolio in the Commonwealth et cetera.

Likewise, with the later stage transmission of research into commercialisation—sometimes referred to as the 'valley of death' between the discovery and the real venture capital coming in at the other end of the time as you go through that valley and it is hard to find money—there is a question there whether that is a role for the NHMRC. We do not believe it is. I think there really does need to be a beefing up of the industry contribution to that from an industry portfolio perspective but also from the industry itself investing more in R&D and venture capitalists coming down into a more high risk end of the spectrum to fill that gap. We would like there to be greater encouragement for business investment in R&D in this country. We are not a strong performer in that area internationally.

Finally, importantly from a cultural perspective in terms of the higher education sector, there needs to be a recognition by everybody in society of how long it takes to move a discovery into a commercial outcome. It is a very, very long time frame. I will give you one example. The human papilloma virus vaccine started with NHMRC funding 18 years ago and is only now reaching the latter stages of clinical trials to become a product which is available to prevent cervical cancer and save 200,000 lives around the world every year. That is a major discovery and it started with research, I am told, in a cupboard in the very early days when the idea was just there.

The real discovery stage of that required an investment and a risk taking by the NHMRC to take on that research in the very early stages and then a reapplication by the same investigator to get continued funding. That process was a repeated application process to get funding every three or five years right through that whole process. It takes a lot of courage and a lot of dedication by the researchers to continue through that. That is a cultural issue that I think we all must recognise—that these people are very dedicated and passionate about what they do.

CHAIR—Thank you very much. Without being provocative, can I start off by saying that from reading the submission and hearing your comments I get the sense that NHMRC wants to be a bit arm's length from the commercialisation. I would have enormous sympathy if you did. I say that because (1) it is my understanding that you do not define it as your key mission and (2) you note in your definition of—how can I put it?—difficulties that people are interested in basic science, if I can be archaic about it, like that and like the peer group recognition et cetera. Where is that interpretation wrong?

Prof. Pettigrew—We are only going to make advances in health outcomes if we understand the basic nature of the problem, and that is the fundamental of: what is the underpinning problem here in this disease? That is one aspect of it. As a spin-off of that process, you can get commercialisation activity happening, and that is why we support it—to an extent. Nobody else is going to take the really high-risk discovery research and support it in the way that we believe it needs to be supported. There is that gradation of activity which is required for basic discovery. As things get more refined and you go down that track, it is important that we facilitate that as much as possible. But then it comes to a really commercialised point in the process and there are other portfolios, I believe, and other responsible parties that should pick it up at that point and take it on. In other words, I do not think the NHMRC should be responsible for discovery right through to product. We have got to draw a boundary somewhere, I believe, because we have limited resources.

Ms Northcott—I think the government made it quite clear in accepting the recommendations of the Wills inquiry and more recently the Grant review report, *Investment review of health and medical research*, that it does see its investment not just in terms of improving health but also in terms of having economic returns. In responding to that, that is why we have established development grants and the Industry Fellowship scheme. We have changed the way we assess grants so that people do earn extra points through the assessment process for patent activity et cetera, whereas it used to be not solely but largely around publication, citation and so on.

We have moved quite a way, but there is a point at which we fund grants—hopefully some of them will have patenting consequences; we do not expect all of them to—and then somebody else has to step in. I think it is complex. It is about the environment within universities and there are very different cultures within universities and basic research. How do you get people from industry and biotech talking the same sort of language? I think that universities have the responsibility for that. They have done it. Most of the big universities have commercial offices and are attempting to do that. I do not think they have done it particularly well. I think most of them would agree that they have not done it particularly well. But they are only one part of the equation. There are a whole lot of other things. The government has established a task force, which will report to the minister soon—I do not think it has yet—on increasing R&D investment in Australian research. This is another area where the biotech industries also have a big responsibility. The industry department has done a lot in establishing industry action agendas.

They have done that through the pharmaceutical industry, for example. But I do not think the NHMRC can be held responsible for everything. Where do you draw that line? It probably varies in different circumstances.

Prof. Pettigrew—Can I add one further point, and that is that I think the NHMRC has undergone quite a cultural shift in the last four years. We are now focusing more on the outcomes of research in a health gain, in a discovery or in a commercialisation vein. So through our avenues we are trying to encourage the researchers that we fund to be thinking out there—to think to the end point of their work while we support them in doing it. I think that perhaps the bottom end of the scale might be collapsing a little bit to become a little bit narrower. This is probably not a good analogy, but it is being pushed out towards the outcomes end of the spectrum and it is all a matter of talking with the researchers to help them think within the outcomes framework.

Ms Northcott—And then, in a very blunt way, by tweaking the selection criteria for grants. That is really how you change behaviours—either through money or, in the case of funding health and medical research, by tweaking the selection criteria so they know that in order to get funds they are going to have to demonstrate more outcomes. Commercialisation is only one aspect. In population health it is about changing practice in clinical research. It is about changing procedures that you might do within a clinical setting.

CHAIR—How much of it is susceptible? I am just picking up your points about views within the research community. How much is susceptible to tweaking? Your submission says:

There is a lack of desire to take basic discoveries and develop them to the point where they are of interest to the commercial world.

Basically, that is not a relevant incentive.

Prof. Pettigrew—Part of our issue here are the time frames over which we can award funding. Our project grants go for three years and our program grants go for five years. In those circumstances the researchers have to come back and reapply for funding. There are many sources of funding for that research to be picked up by and sometimes it is more appropriate that some of that research effort is picked up by an industry focused scheme.

CHAIR—Can I just refer you to point four on page 10 of your submission, because that is what I am trying to understand. I am not trying to put you on the defensive. I am just trying to understand the processes because you are being clearer than a lot of the other people who have fronted up and talked about how about significant commercialisation is. You have got a rather different perspective.

Prof. Pettigrew—That is right.

Ms Northcott—I think you can tweak it. I would point to our program grants, which are a new scheme. The fourth round of those grants has been announced. They are five-year grants, but the fourth lot start next January. Because we have in there specifically that you get points for commercialisation and having taken things to market, you will see that a lot of our program

grants have a focus on commercialisation. Attachment B or C in our submission gives a few examples.

Prof. Pettigrew—Your point is coming to what is not perhaps said in here. My experience from the tertiary education sector indicates to me that many academics in that setting will regard scholarly publication more highly than commercialisation outcomes. That is an issue that has to be addressed.

CHAIR—Why? Is publication an end in itself or is publication a more significant way of advancement than money?

Prof. Pettigrew—I believe that scholarly publication in the best journals internationally is more highly recognised as a mark of achievement and an attainment of skill and standing than a patent or some sort of commercialisation outcome. At a junior level of the academic spectrum, the concentrated effort has been in terms of how many scholarly publications you can get. There is a shift towards recognising commercialisation, but I do not know that it is happening quickly enough. What we are trying to do is drive it that way by giving the wherewithal for further research to be done based in part on your success at commercialising something. So we are trying to shift that.

Mr HAYES—The notion of 'publish or perish' is still well and truly alive?

Prof. Pettigrew—To an extent, yes.

Ms Northcott—To a large extent, but we are trying to change that. Everyone recognises that it is not a particularly useful way of changing behaviours. It does not suit all disciplines in the research sector—clinical research, for example. Citations are not a good measure across all disciplines, although it is in some.

Mr HAYES—You are right. I have seen a significant move in the university communities. They are certainly moving with an eye to either partnerships or commercialisation. But that in itself creates an additional role for your organisation, does it not, in the way you are allocating your grants? You are effectively involved in the financing and have one eye on commercialisation as well. When we are talking about tweaking the applications for it, those things must be in the forefront of your mind as you approach that.

Prof. Pettigrew—Exactly.

Mr HAYES—What are the issues that need to be addressed, apart from just considering an application? If we are talking about some significant project you want to see taken through to commercialisation, I am sure you do not just pick the best researcher and leave them out there on their own.

Prof. Pettigrew—Most of our funding is awarded on the basis of applicant approaches to us. We have a wide range of projects where we are strategically directing money towards a particular health problem. But, on the whole, the things we have been talking about come through on the basis of applications that we receive for funding support.

Mr HAYES—But do you actually go behind that and look at having some cross-movement of researchers and at helping the development of research to that extent? Is that the Marie Curie project?

Prof. Pettigrew—That is an example of an overseas mechanism. That is how the French are going about it.

Mr HAYES—Is that something that you would look to?

Ms Northcott—Development grants are a good example of what we do domestically—early proof of concept type applications to assist people to take it to market. The committee that assesses those grants—and they are assessed, like most of our grants, on significance and feasibility—strongly encourages people to have a commercial partner by the time they come to us. We found that was difficult for a lot of people who are working in academic institutions where the links are not already there. The panel that assesses those grants is made up not just of researchers and people who are knowledgeable in the field—who do our usual process of peer review—but also of people who are out in biotech et cetera. They can provide quite good advice and feedback to applicants about who might be interested and those sorts of things. Is that what you are driving at?

Mr HAYES—What I am very interested in is the void, apart from the commissioning and undertaking of the research and the commercialisation—I think you called it the 'valley of death', and that is probably right. You see a great opportunity for industry. I am not sure industry sees that until they make a very clear decision on commercialisation. What recommendations would you have in addressing that aspect, other than saying to industry, 'You should be doing it'?

Prof. Pettigrew—I have given this a bit of thought and I have started a dialogue with some colleagues in the industry portfolio to really come to understand what they are driving at and what we are driving at—let us have that dialogue between basic research or discovery and research funding organisations and the industry portfolio to see what better alignment we can get between our schemes and theirs. Quite honestly, I do not think that there has been enough of that conversation.

It is fortunate that we are now physically located in the Department of Industry, Tourism and Resources building in Civic. So we are just a couple of floors apart in the one building. We are now starting to have some meetings and getting people talking. I have gone and asked them for some mud maps of where the funding schemes that the industry portfolio puts together start and where the ones that we fund stop? Is there a break in the continuum there or not? So far there does not appear to be a break, but is it working properly? That is the sort of question I am asking at the moment. We have to get into that dialogue with our industry portfolio colleagues to understand how they are approaching it and get them to understand how we are approaching it, and we need to work together more on that.

Mr HAYES—Are you suffering the same effect as a decline in R&D over here or, in your industry, has it generally been the accepted case that there was that difference—that industry was out there waiting to have a full package and full commercialisation?

Prof. Pettigrew—That is right. Industry is at the low-risk end. That is where their investment is. They do not move terribly far down into the high-risk end. We are concentrating our efforts at the high-risk end. That has been, in part, history and tradition, but we are also moving out to the right out of that through our development grants et cetera to try to follow out a bit further.

Dr JENSEN—Do you have an overlap on that? Is there some third agency that maybe should have oversight of that overlap area so that you can get better synergy with industry?

Prof. Pettigrew—The sort of overlap that I believe is there at the moment is between ARC funding and NHMRC funding—the whole raison d'etre of the CSIRO and R&D Start program, which is offered out of the Department of Industry, Tourism and Resources. Then at a later stage you come to the COMET program and the BITS program. I do not even know what they all stand for. Then there is the Innovation Investment Fund Program, which is a little bit further down the track. We have to get a much better understanding of where our funding fits into that overall set of schemes. I think there does need to be better coordination of that activity.

Ms Northcott—And probably better promulgation from DITR's perspective in terms of health and medical research. I think they probably do an excellent job in the non-health-and-medical sector.

Dr JENSEN—I guess if you had a funding path all the way through that was relatively clearly identified it would certainly help.

Prof. Pettigrew—That is exactly what I have been working with the industry people to do—to try to find a mud map which I can put out for people in the university sector to see. You start off with a bit of ARC funding or NHRC funding and you then collaborate with the CSIRO on a project. Where do you go then? With my background, I would not know where to start. I think it is an educative process, with the industry portfolio talking to us and us talking to them. But how do we bring these things together and talk to the same set of stakeholders to get the continuum happening? That is what I would like to see.

Ms Northcott—What is interesting about health and medical research is that 70 per cent or so of our funding goes through the university sector, but we fund a hell of a lot of very exciting cutting edge research in medical research institutes. We have been trying to raise the profile of medical research institutes within a government framework—DEST, because it deals with the ARC and it deals with universities. Higher education has traditionally forgotten about what is going on in medical research institutes and we have been bringing them into the picture, and I think that has been working. Government provided infrastructure funding two budgets ago, for example, for medical research institutes. But I think maybe industry needs to engage better with the MRIs.

Dr JENSEN—Absolutely, because there are some very high profile, very successful—

Ms Northcott—That is right, such as QIMR and at WEHI. WEHI has a lot of grants in collaboration with this.

Prof. Pettigrew—They are the Queensland Institute for Medical Research and the Walter and Eliza Hall Institute for Medical Research.

Ms Northcott—Yes. And they have a lot of work going on with the Gates foundation, with National Institutes of Health in the US. There is a lot of international collaboration with commercial potential and international patents et cetera. As Alan said, he has commenced that dialogue with them, and I think maybe the NHMRC can be a good broker of that.

Dr JENSEN—So, in your view, is the Walter and Eliza Hall Institute of Medical Research type of model, in their meeting with industry, more effective than that of universities? If so, is that something where maybe some lessons can be taught to the universities?

Ms Northcott—I do not know if you can say that is a definite rule, because work done by John Mattick, for example, and the human papilloma virus work that Alan referred to earlier, has come out of the University of Queensland. It is very hit and miss, but I certainly think it would be worth talking to some of the people that we are talking to.

Dr JENSEN—In that instance, would it have been brought on sooner if additional funding and so on had been identified earlier on? You identify that as a very successful project, but is it actually a little bit behind where it should have been on the time line because of the lack of interaction with industry and universities?

Ms Northcott—I do not know.

Prof. Pettigrew—I really could not answer that question. You would have to ask Professor Frazer, the inventor, to answer that question. But the sense I have is no. The sense is that, in my view, it took the 18 years to get the first discoveries, then the confirmation of the discoveries and then the redevelopment of the discovery—that whole process of scientific development. I am assuming that that all worked very smoothly and that industry came in at the right time and they got all the right contracts organised and so on, but it has taken 18 years to get there. I cannot answer your question specifically, because there may have been a couple of years gap in the middle where, if an industry partner had jumped in a bit more aggressively than perhaps they did, it would have come faster. I do not know.

Dr JENSEN—Would it be possible to get that information?

Prof. Pettigrew—Sure.

Ms Northcott—It may have been different if it had been something for arthritis or one of the major chronic diseases. Maybe industry would have taken it up more quickly; I do not know. But I think the example is interesting in the sense of what does get missed. That is an example of something that has finally come.

Prof. Pettigrew—Yes. Where are the lost opportunities? That is another issue that is quite concerning anyway.

Dr WASHER—Somewhere in this 10- to 18-year span that it takes from thinking about a product to getting it commercialised, there are a lot of funding needs that drop out, even if we amalgamate and look across these different fields—which you are now doing, and that is terrific; thanks for doing that. I see there is international collaboration. In the diabetes vaccine, for example, the Juvenile Diabetes Research Foundation is involved. That is exciting. These are

very exciting, simple concepts but with massive potential. They are absolutely very exciting. Do we have industry brokers in this country marketing them? Do we have a sort of privatised Austrade equivalent dealing with it, where we have people getting the venture capital, attracting business into these industries, looking for investors for these good ideas, thinking, 'That's great; I'll market this'? Is someone not exactly turning it into a public company overnight but just looking around for great ideas in Australia and getting Australian business to invest?

Prof. Pettigrew—In the biotechnology field there is Biotechnology Australia. Out of the industry portfolio, there is AusBiotech—or whatever it is called—doing that job. They are out there, touting Australian discovery and business internationally. They attend the big bio conferences in the United States, along with several premiers and others. I think they are doing an effective job in that field, but it is very tightly focused on the commercialisation of biotech discoveries for medicinal type activity or health related activities down the track. I think there is a good job being done there, but whether or not it is sufficient is another question. I cannot answer that question.

CHAIR—I will just pursue that. You said it was tightly focused, as if that were a criticism. Is that a compliment in the area where it is focused and a criticism that it is not more broadly focused?

Prof. Pettigrew—I think both of those, yes. I am not expert in that by any means, but that is the sort of impression I have. It is backed up, in a sense, by my understanding that the biotech industry in this country has a lot of small companies that have got a very small number of products on the shelf, or products getting onto the shelf, and so each one of those companies is somewhat of a high risk because they could drop off the shelf just as quickly as you put them up on the shelf.

Ms Northcott—Or not quite ever make the shelf.

Prof. Pettigrew—Or not even make the shelf. I think that sector is high risk, but there is a lot of effort going into it in this country.

Dr WASHER—I am fascinated with this. Is this a statement of an appropriate balance being maintained, these other factors determining success, between Australia's ethical standards and the requirements for health and medical research? Why I ask that is I guess NHMRC is responsible, as you mentioned, for the Stem Cell Centre.

Prof. Pettigrew—We do not have a responsibility for that at all.

Dr WASHER—Who does the approval for that, by the way?

Prof. Pettigrew—The funding for that came from the ARC—Australian Research Council—and the industry portfolio together.

Ms Northcott—Biotechnology Australia specifically, isn't it?

Prof. Pettigrew—That is right.

Dr WASHER—Who does the approving?

Prof. Pettigrew—The approving of the funding?

Dr WASHER—No, the approval of the research.

Prof. Pettigrew—The ethical approval of the research that is conducted there would be handled by the institutional ethics committee, which has to comply with the NHMRC's guidelines on ethical review.

Dr WASHER—So it is under your guidelines?

Prof. Pettigrew—It is under our guidelines, yes.

Ms Northcott—That is correct.

Dr WASHER—Why I asked that is there has been some level of criticism that it is taking about 18 months. I do not know whether that is true or not, but that seems to be a long time to get approval. I am not being critical of that; it is probably pretty complex. But it is a fascinating statement that—

Ms Northcott—What page is that on?

Dr WASHER—Sorry, it is under 'factors determining success' on page 7 of the summary. So it really does fall under the National Health and Medical Research Council to make final approval of some of these questions based on ethical and other factors—an incredibly long time.

Ms Northcott—I have to say that I just have never heard of anything like that—18 months. When we approve a grant, if it involves research using humans—or embryonic stem cells in this case; I presume that is what we are talking about—it is approved to commence usually on 1 January. So the minister, hopefully, is going to make announcements in October, for example, of project grants and fellowships and so on for grants to commence on 1 January 2006. People have six months in order to get their ethical clearances. I am aware of one grant at the moment that has taken longer than 12 months, but it does not involve stem cells. It is usually a six-month period.

Prof. Pettigrew—The whole ethical approval process should be over in six months in our case.

Dr WASHER—That is faster than they give us as an impression.

Ms Northcott—Hugh Niall, who is the CEO of the Stem Cell Centre, is also the Chair of the Diabetes Vaccine Development Centre—two quite separate enterprises except that Hugh wears two quite different hats in different settings. I am sure that if there is an issue of approvals taking 18 months he would have brought it to my attention, and he has not. I really do think that is highly unlikely

Dr WASHER—They stretched it out.

Ms Northcott—Yes.

Mrs VALE—You say on page 10 of your report that there is a generally negative perception of commercialisation by the research community. Is that because it is all too hard, or because they are really more interested in doing the research; or is it, as you were saying, that maybe we need to have some sort of direction whereby they can get proper funding? You were saying that there was a need for a mud map, if you like.

Prof. Pettigrew—There are lots of elements to it.

Mrs VALE—Yes, I bet there are.

Ms Northcott—All of those, probably.

Prof. Pettigrew—I get a sense that some academics would prefer to publish in scholarly journals than take out a patent. But there is also a growing awareness amongst academics that they really should be, where appropriate, moving towards commercialisation of their work. Not all work that we fund is appropriately going to be commercialised. There are lots of grants that we would fund that we would not expect a commercial return from but from which we would certainly expect a health outcome improvement, which is not a commercial return.

Mrs VALE—It is still a return of great value.

Prof. Pettigrew—Absolutely, and an economic value as well. If you find a new way of treating a certain disease or whatever which does not involve a pharmaceutical or anything like that but which involves a different way of treating that patient from step 1 to step 5, and then you can leave out step 3 quite satisfactorily based on a properly conducted clinical trial, then you will end up saving money. That is an economic return to the country as well as improving the health outcomes of the patients involved. You would not expect a commercial return out of that and you would not patent anything out of that. That becomes a natural process of improving clinical practice. We spread that word by gathering the evidence, reviewing the evidence and producing a clinical practice guideline which then instructs all the clinical practice practitioners in that field—around this country, anyway. They get access to our guidelines and they can adjust their practices accordingly.

Mrs VALE—Professor Pettigrew, do you see a role for your organisation in trying to improve that negative perception for the research bodies? When you actually know that perhaps a particular research institute is more interested in publishing, as you said, than actually taking out an intellectual property protection, do you have any influence over that?

Prof. Pettigrew—We do insofar as we have adjusted our criteria for funding to make it quite explicit that if you are commercialising something appropriately then you will be recognised for having achieved that.

Mrs VALE—When did you actually adjust your program or your criteria for funding to do that?

Prof. Pettigrew—We did it progressively, but it was two or three years ago.

Mrs VALE—Are you seeing a definite increase in the way that you hoped it would go?

Prof. Pettigrew—Yes, absolutely; already.

Mrs VALE—So that has been a very successful move?

Prof. Pettigrew—We are recording the number of patents that people put forward in their applications to us. We have recorded the number of patents and it has gone up. So people are reporting it more. I suspect that that level of activity has gone up accordingly as well.

Mrs VALE—So the next real step then is actually how you commercialise those patents and the kind of investment support that the particular funding body can actually generate. That is the valley of death that you were speaking of.

Prof. Pettigrew—That is right, and we have moved into that valley of death, to some extent, through our development grants. But the discovery end of the spectrum is chewing up so much of our resources that we do not have a lot of resources to move out to that right-hand end. If we moved a lot of research out to that right-hand end, we would be diminishing the basic discovery end of the spectrum, which we believe is crucial for both commercial and non-commercial outputs. So we have to balance the portfolio appropriately to get the best outcomes. That is where we sit at the present time. Whether we move more to the developmental commercialisation spectrum or not is something we are constantly looking at.

Mrs VALE—That is the delivery end, though, isn't it? That is really important.

Prof. Pettigrew—Yes, but I would contend that so is the discovery end. The discovery is the generator of the ideas that lead to the potential for commercialisation.

Mrs VALE—What comes first? It is the chicken and the egg, isn't it?

Prof. Pettigrew—Absolutely.

Ms Northcott—But if there is no basic discovery—

Prof. Pettigrew—Then you will not have a commercialisation.

Mrs VALE—You will not have an egg, or a chicken.

Ms Northcott—I think it is also legitimate to recognise that the drive and the fascination of some researchers comes with the basic discovery, and that is what they are really good at.

Prof. Pettigrew—And you have to recognise that.

Ms Northcott—Maybe you need another group, another cohort, of people who take it.

Mrs VALE—You need an entrepreneurial cohort who gets a buzz from actually bringing it to market.

Ms Northcott—That is right.

Prof. Pettigrew—I think that some academic institutions are moving quite rapidly towards that. From my own family's example, my son, when he moved into postgraduate study, received training in commercialisation—not accurate training but he received an experience of what steps you would go through to patent a discovery. That was at an early postgraduate level.

Mrs VALE—So that is focusing the mind at a good time.

Prof. Pettigrew—Focusing the mind very early, yes.

Mrs VALE—Before they get so enthralled within the discovery about something.

Prof. Pettigrew—At least it is educating them that that is an opportunity they should be made aware of and should keep in their mind. I think every scientist should have one eye on that as a potential outcome whilst concentrating on the main game, which is the discovery, assuring the discovery et cetera and moving it to the next stage. If it can then diverge out to a commercial outcome at the appropriate time, well and good—go for it. But you have to have the other skills to be able to recognise that point in the process, and you have to have people around you who can support you with that point in the process. I think we need to develop that skill base to identify at the earlier stages of discovery when something is heading off into that period when commercialisation is going to be a proper outcome for that work. It is an interesting time.

CHAIR—One of the overwhelming things that I have got from these hearings is that there may be difficulty in commercialisation but you need to be Einstein to work your way through the program structure. If you are a researcher, it must be incredibly difficult.

Prof. Pettigrew—If you are a researcher, and you have trained up as a postgraduate and done a PhD and you have moved on and become an academic and so on, usually at middle-age these days, you not only have to have training in your science area but you also have to have training in entrepreneurship and in being able to talk to venture capitalists appropriately. You should have some background, or at least the facility, to get advice on legal aspects and commercialisation aspects. I do not think you can expect scientists to be fully aware of absolutely every aspect of that, but you have to have the support teams around them that can communicate with scientists to make sure that you move the discovery out to that new environment.

Ms Northcott—And I think that is an institutional responsibility.

Prof. Pettigrew—I believe so.

Ms Northcott—And some do it extremely well and some less well.

CHAIR—Going back to your point about the distinction between commercialisation and translation, could we have something back to us that shows how the expenditure by NHMRC is divided between the various elements? There may be a third or fourth element, but I would just like to get across how you classify your expenditure by commercial and non-commercial returns—just crudely, because I think one of the things that the committee has actually lost a bit

is the point that you have made about the importance of basic research—or whatever they call it nowadays.

Prof. Pettigrew—We call it discovery research.

CHAIR—Yes. And what we have actually missed is the non-commercial but economically significant returns.

Prof. Pettigrew—I can give you an example, and I think this may capture what you are trying to say. We fund clinical trials. When people hear about clinical trials, they automatically put 'pharmaceutical' on top of that, and that is a drug which is going to get onto the market shelf. But there are many clinical trials that we fund for tens of millions of dollars per annum which are not pharmaceutical based trials—they are trials in improving clinical practice.

Ms Northcott—So it might be a surgical intervention, it might be a population health trial, melanoma—

Prof. Pettigrew—So there is another aspect of this whole research going on, and that will lead to an improvement in health outcomes.

CHAIR—And half the time you would pay them to adopt the innovation!

Prof. Pettigrew—We will not go there!

Ms Northcott—We can break up our activity in terms of clinical trials, for example, into trials that have or do not have a potential commercial outcome, but I think what might be a more interesting way of demonstrating this issue to the committee is the growth in the number of patents over the last five years—

CHAIR—We would like you to do both.

Ms Northcott—and the growth in terms of things like program grants in terms of—

CHAIR—We are also after capturing what the organisation does across the board. We would like both.

Prof. Pettigrew—Okay.

Ms Northcott—Yes.

CHAIR—I would be interested in that, but I also want to see which way the expenditure is going in terms of things that yield gains.

Ms Northcott—That is fine. I think I misunderstood that.

CHAIR—It is illuminating things—we are not doing an acute analysis of NHMRC.

Ms Northcott—So it is sort of economic versus health outcome and—

CHAIR—Yes, and where your money goes.

Ms Northcott—how the portfolio is spread.

CHAIR—Yes, and we are also interested in the generation of greater numbers of patents et cetera, but you can phrase that as you wish.

Ms Northcott—We are happy to do that.

CHAIR—That has been very illuminating. Thank you very much.

Ms Northcott—Is Research Australia coming to speak to you today?

CHAIR—No.

Ms Northcott—I might leave you with a publication that they did last year, which has case studies of 100 biotech companies. It is really interesting. I do not know quite how they selected them or how random it is, but a third of them cite NHMRC early discovery grants as being instrumental.

CHAIR—Thank you very much. That was very useful.

[5.31 pm]

BRADEY, Dr Warren Douglas, General Manager, Access, Australian Nuclear Science and Technology Organisation

COLLINS, Dr George Andrew, Chief of Research, Australian Nuclear Science and Technology Organisation

GOODWIN, Dr Miriam Winifred, Senior Advisor, Science Policy and Planning, Australian Nuclear Science and Technology Organisation

CHAIR—Welcome. Do you have any comments to make on the capacity in which you appear?

Dr Bradey—Access is the commercialisation arm of ANSTO.

CHAIR—The committee does not require witnesses to take an oath, but these are proceedings of the parliament and they warrant the same respect as proceedings of the House. It is customary to remind witnesses that giving false or misleading information is a serious matter and may be regarded as a contempt of the parliament. Would you like to make a brief statement in addition to your submission?

Dr Collins—Yes, thank you.

CHAIR—We are in your hands.

Dr Collins—ANSTO is known for facilitating some pretty stand-out things. We are the principal supplier of radiopharmaceuticals in our local market. We operate Australia's only research reactor and soon we will operate a new research reactor. One of our best known innovations is synroc, which is designed to immobilise radioactive waste. That has been a long journey, and it is finally bearing some fruit, I am pleased to say. Behind those front row things, ANSTO has a broad capability which is there to support those stand-out activities, but that has given us a breadth of capabilities that range from working in the environment and working with materials to applying neutron and X-ray scattering and developing new radiopharmaceuticals.

That is a challenge for us, because that broad range of capabilities is not just directed towards our own innovations but we see it as very important to support other people's innovations. ANSTO being a technique based nuclear science and technology organisation means that we are really there to facilitate what others do—others' research and all the way through the spectrum to the innovation—as well as our own research. Those others include other research organisations such as CSIRO, the universities and industry. Those that come to us in industry range from the very smallest of SMEs right through to the main players.

Because we see our role as a facilitator in the innovation process, that is where we have focused our submission and the things we would like to put before the committee. It is true that they are based on big investments. OPAL, our new reactor, is a more than $300 million

investment. That is something that people see, but the investment is also in the capability—the people and the knowledge. It supports what we do and what others do.

Having that big investment in something like OPAL makes us significant not just nationally but internationally. It builds those connections to others. That is important in the innovation chain too, because we get links to other researchers. If we want to innovate in other places, often that is through other researchers, and of course it works the other way. Information we get from other researchers comes back to us and we can bring in ideas in cooperation. That is one of the side benefits of having a significant investment in infrastructure such as the new OPAL reactor.

We see the important thing in the pathways as integrating the various parts of the innovation process. Because we are not only an innovator ourselves but also a facilitator of other people's innovation, we see the importance of the relationships that develop. In the submission we have called it the user-producer relationship, involving us as a producer of knowledge and new ideas. Not all of them are our own. As I have mentioned to you, we can tap into discovery that occurs at ANSTO and also in other places and bring that to the users—those who eventually innovate.

That process is an important one, because there are many potential places for innovation to occur. Innovation does not just occur in research. It often occurs in a small company or someone in the back shed. That back shed can be anywhere in world. It is about building those linkages through. Often we will have someone come to us with a great idea and say: 'I've had this idea—I've played around with it and this is what it shows. I think it will be useful. Can you help us along the road to innovation?' So they see a publicly funded research agency such as ANSTO, which is fairly broad based in its capabilities, as a way to further innovation.

Of course, that raises one of the big barriers. The people in the back shed can number up to 50 or 100. They do not always have enough money for innovation. At some level there has to be some discussion about what part of publicly funded research money we might put into supporting it or coinvesting in it, because often they have some money. They may have access to some of the grants that we heard about before—Commercial Ready or whatever—to help them along the way. But there is that issue of how we fund that innovation together.

The other advantage we have as a public sector organisation is that we are not restricted and we often do the precompetitive work. That works best when we can build groups in an industry sector. One industry sector we have done that in over the last few years is a number of medical device companies around Sydney. We started working with one and now we work for three. We do background research work for them and we also participate in their processing.

Another role we see ourselves in is as a thought leader. That is the second issue we raised in our submission. As a publicly funded research agency, one of our roles, I guess, is to stir the pot a bit, make people think some more and introduce new ideas. Again, that works best when we can do it with others. We have found that cooperative research centres are a great method for doing it because you have some of the end-users, perhaps some more innovative ones—those who are prepared to cough up the dough to join the CRC. But you are working through them to the whole industry. When you can bring in other users through not only the CRC but also often industry associations, that is a way we can act as a thought leader.

One of the case studies we have brought in was the work we have done in power stations. That really began almost 15 years ago, when Pacific Power, which then owned power stations in New South Wales, sponsored some work at ANSTO to develop models for assessing the damage that occurs in power station components. That led us to be able to estimate how much life is left in a power station component. We have built on that. Now we continue the research in that area but we also offer service work, and some of the other suppliers in the industry that we work with offer it as well. We now offer that work right through Australia and even overseas. That was really thought leadership—shared, in that case, with Pacific Power.

It is not all good. I am going to end on some of the downsides that we see in our role as a part in this innovation chain and in trying to make innovation work from the ideas through to the commercial reality. As a publicly funded research agency we do not compete on a level playing field with some of the other research providers. We are seen as special, we get block funding—and that cuts us out of some other funding. So there is some early stage discovery research funding that we cannot access and, probably more importantly for this discussion, often when we work with a company they expect that we will be able to provide extra support to them. I have raised the issue that we can co-invest in things but often, in the way that our support is judged, it does not really count. Our contributions, for example, cannot add up to the contributions to a project for the Commercial Ready fund, and some of the companies, particularly the smaller cash-strapped companies, find that a little bit discouraging.

CHAIR—You mean that the level playing field is skewed against you!

Dr Collins—Yes, that is right. So sometimes the company can only treat us purely as a subcontractor. That can work in some cases but it is not the best for the ongoing relationship that we try to develop with some of our end users. The final thing, I think, concerns the costs of protecting our intellectual property and patenting, and that is an issue for Australia. Warren and I are trying to work out better ways of doing that in the organisation. There is a pressure to patent very early, almost too early. Now we are hanging back, and we are worried that we might be hanging on too long before patenting. That means that lots of innovations get pushed too early and you are almost trying to push too many without doing a bit more work and selecting partners to do them to go. Those are the issues we see facing us at the moment and we are very happy to answer questions.

Mrs VALE—ANSTO is the second largest corporate employer I have in my electorate and it contributes over $70 million a year to the local economy.

CHAIR—Some of us love you to death!

Dr Collins—We have got some friends on the other side of the table.

Mrs VALE—Every time the anti-reactor people have a protest my vote goes up.

CHAIR—What has happened with synroc?

Dr Collins—Originally the market for synroc was high-level waste from reprocessed fuel. There is not that much reprocessing going on at the moment and what was going on was committed to glass, particularly with the French and in the UK—borosilicate glass. A new

market has come up for synroc. There is a lot of clean-up work going around after 50 years of experimentation, both defence and power related and scientific work around the world, and people are cleaning up what we call 'legacy wastes'. With synroc we have pushed it towards adapting the concept, depending on the waste stream. The biggest project at the moment is in the UK, where we are locking up a couple of tonnes of leftover plutonium wastes that have been around for a long time. This one was given to us as a challenge because it was very difficult, and that plant is now being built. Even at ANSTO we are using synroc—

CHAIR—But that is still at the high end, which was what synroc was supposed to be about.

Dr Collins—It is not high-level waste. One of the issues now in locking up radioactive waste is not just to protect it from the environment but also to protect it from people who might want to get back to it, particularly material such as plutonium. In that case, it has got a high interest but it is not classified as high-level waste.

Mrs VALE—You were about to say something about ANSTO. Are you looking at using synroc to lock up some of the legacy wastes that we have out there—say, at that Little Forest place?

Dr Collins—The waste we are dealing with is the waste from the production of radioisotopes for about 30 years. We plan to put it into an adapted synroc for that particular waste. That will be ready for an intermediate level store—

Mrs VALE—When we find one.

Dr Collins—Yes.

Dr JENSEN—With ANSTO, is the word 'nuclear' a turnoff in terms of some industries that you might want to do business with? Are industries that might be able to use your services aware of services that you might have such as neutron scattering and materials characterisation?

Mr TOLLNER—Such as what, Dennis?

Dr Collins—One of the main scientific uses of the reactor is to produce neutron beams which are used to study the properties of materials in the same way as X-rays do. Neutrons from a reactor are very complementary to X-rays from a synchrotron.

Dr Bradey—It is certainly an issue, as people always—industry in particular—think of ANSTO as nuclear and they do not necessarily understand the breadth of the services that can be provided, and the fact we can provide a lot of things as a one-stop-shop. That is one of the things that we are doing at Access ANSTO: to try and improve that awareness and broaden our services base.

Dr JENSEN—Certainly one of the things that amazed me when I went through ANSTO was all the people that I knew that various people at ANSTO knew as well.

Mr TOLLNER—Talking about these things that are not necessarily made within your reactor, I was at a public meeting very recently with the Darwin No Waste Committee and the

view expressed by all five speakers was that there is no such thing as a radiopharmaceutical that needs to be created in a nuclear reactor, and there is absolutely no case for the new reactor at Lucas Heights. Is that correct information? Can all radiopharmaceuticals be produced in another process? What is the real case—pardon me as I am a Philistine when it comes to this sort of thing—for the new reactor?

CHAIR—You have got 35 seconds!

Dr Collins—The radioisotopes used to make radiopharmaceuticals are produced in two ways: either in a reactor, where you effectively blast them with neutrons, or in a cyclotron where you blast them with protons. You produce different sorts of radioisotopes in the two different machines. ANSTO runs both, as well as there being cyclotrons in a number of hospitals around the country.

Mrs VALE—You still get waste from cyclotrons.

Dr Collins—You do.

Mr TOLLNER—What they were saying at the meeting is that everything that is needed, that is required, can be done in a cyclotron.

Dr Collins—To commercially produce any of these things you need to do them either in a reactor or in a cyclotron. If it is experimental and there are very small quantities you can try some of the other reactions—that is what those people may have been talking about. But in reality, to produce the amount of radioisotopes—even just to service Australia's needs, let alone the needs of our region, which is what we hope to do—you need a reactor for a lot of the isotopes and you need a cyclotron.

Dr JENSEN—You have all that Americium-241 that is in all the smoke detectors that people do not know about.

Dr Collins—Yes, but the other reason for having a reactor, the one that Dennis referred to, is for the neutron beams that are produced. They really enable us to study deeply into the structure of materials, and biological materials and new materials.

Mrs VALE—It is also my understanding that cyclotrons do not make the full range of isotopes that the reactor can make, so they are two different kinds of machines—one produces pears and the other produces apples.

Dr JENSEN—You have been taking science lessons, Danna!

Mrs VALE—I have picked up a lot by osmosis.

Dr Collins—The other main use of the reactor for commercial applications is that we actually transform silicon—what is called neutron transmutation doping. That is used for the microelectronic industry and that is something we do as a service. The main customers are overseas so it is really an export business.

Dr JENSEN—It is like that water project you are running as well that is very interesting

Dr Collins—That is using our capabilities in understanding isotopes and the environment to track what water is doing in basins and the flows and so on.

Mrs VALE—There is another ramification of that. If we do not have a reactor to produce the quantity of isotopes we need for our domestic market—and we do import some from overseas—they also have a half life, a shelf life, which rapidly declines and if we did not produce them here in Australia—

CHAIR—We will put you up as a witness if you are not careful!

Mrs VALE—These are important ramifications for our Australian citizens. It means that Australians who have a health problem would have to wait in line with the rest of the world to have these isotopes delivered to them. And not only would they have to wait but they would also have to pay the exchange rate. Our reactor makes these kinds of medical therapies cheap as chips.

CHAIR—Who was smart enough to find you for the remnant power and infrastructure?

Dr Collins—I mentioned the work we did with Pacific Power.

CHAIR—How did it happen? How did they think of you to say, 'Can you do it?'

Dr Collins—A lot of the capabilities we have are directed towards our core business. So we retain a lot of experience in materials because of our knowledge of the materials and how they behave in the reactor. It turns out that, with respect to the way the materials behave in the reactor—it is at low temperature—some of the physical changes in the materials are similar to what occurs at high temperature under stress. It is a process called creep. They saw that we had expertise there and asked us to develop it. Once we started developing it—

CHAIR—They thought of you.

Dr Collins—Yes, they thought of us.

Dr Bradey—There is a commonality in materials analysis work. It started there and it has broadened.

Dr Collins—Once you start working with them, of course you can take it in other ways.

Dr JENSEN—I have two more questions. One is the issue of skills. The last nuclear engineering faculty closed in 1988. What are you doing to address that? I have noticed a greying of our expertise in the nuclear field.

Dr Goodwin—It is an area of some concern to us. We are not alone in scientific organisations in that regard. There are a number of organisations that have a real demographic issue facing them. What we are doing is working on a capability development plan that we are going to roll out to look at where our gaps are. In fact, one of the things we are doing as part of our

implementation of the research quality framework, our advance implementation, is to get a better understanding of where those early career development challenges we are facing are, because we are very conscious that we are facing a real demographic change.

We have been running a number of in-house courses as well because we have had to do that. As you said, the publicly available courses are not there the way they have been in the past. One of the challenges we have as well is the breadth of the applications of nuclear science. It is such a broad area that it is not just a case of people who have studied nuclear science but a case of people who are perhaps undertaking environmental studies or some other aspect of engineering to understand the potential for this sort of application. That is where, particularly, the Australian Institute of Nuclear Science and Engineering is important because it is a joint venture of almost every Australian university and us. That means we can get out there to the universities and young students and academics can have a better understanding of the potential of what we do. That sort of ongoing relationship is really important, for each generation to have a sense of an opportunity to participate in using our facilities, the reactor, the accelerators or whatever it is.

Dr JENSEN—The product that should be taking pride of place is synroc. Ted Ringwood did his initial work with this in the 1970s and it is in effect just starting to bear some dividends now. Why has the uptake been so slow?

Dr Collins—It is a very unusual market. It is a very political market and there are other issues. So, for example, the US decision at the end of Jimmy Carter's presidency to not reprocess meant that the major potential market was closed because with synroc you had to reprocess first. Those who were reprocessing were already committed largely to borosilicate glass. The market opportunity there was reduced. For a while the people developing synroc said, 'We'll keep saying for the future, this is really something.' But as we were doing that it was almost as though the other market appeared. Maybe it is a bit like what happened with the power industry—people realised that there was a capability there. We were using this concept of looking at what nature did with minerals to lock up radioactive waste. We were directing it towards one particular radioactive waste but what about all these others? I guess the turning point was when the US and Russia together decided to do something about their weapons-grade plutonium. There was a contest as to what they could lock it up in. Something like synroc that was developed with ANSTO won that contest.

That did not go forward to produce a plant, because they decided that they would use that excess plutonium as fuel in power reactors, but it lifted our profile again. Once our profile was lifted, people said: 'They're not just developing it for one application; it's something that can be developed for a multitude of applications.' So it is almost as if people now say: 'Can you handle this? Can you handle that?' If I were drawing a general lesson for innovation, it would be the idea that, if you are too narrow, you may get to your goal, but if that goal moves you had better broaden and see how—

Dr JENSEN—Certainly, in my view, it is technically the best solution for waste.

Mrs VALE—Nothing is quite as powerful as something whose time has come, and synroc's time has really come, hasn't it?

CHAIR—We thought it had come in 1977, actually!

Mrs VALE—That is another story. I am interested in the commercialisation aspects. Your report says that when Dr Ian Smith became the executive director, in order to improve the commercialisation focus, he separated ANSTO Radiopharmaceuticals and Industrials, or ARI, and ANSTO Minerals from the divisions of which they had been part, and he made them into distinct business entities. That brought a top-level focus onto commercialisation. You go on to say:

As part of its strategic planning, ANSTO has introduced clearly focused classifications for its activities for use in budgeting, planning and monitoring. Two of these classifications, Business Services and Outreach Research, have a primary emphasis on commercialisation. Both are customer-focused and driven by business plans.

Is it too early to say how this different strategy has helped? Have you seen a greater activity in commercialisation?

Dr Collins—I will talk from the point of view of the overall research, and maybe my colleagues will want to add something.

Mrs VALE—That is a very important change for ANSTO, isn't it?

Dr Collins—It is to say that something was already there, but to recognise it—

Mrs VALE—You just refocused it?

Dr Collins—and to say that we do work at the discovery end and we do work at the outreach end. The capability that underlies the two may be similar, but there is also a view that to excel in them you need to focus on them, so let us not try to make everyone cover the whole spectrum. Some projects are really developing something brand new, some discovery; others are trying to solve more specific problems; and still others are going out to the customers and saying, 'We're reaching out to them.' Finally, there are those who are really trying to make a business out of it, as in the production of radiopharmaceuticals and minerals. That focus was one of the main differences, but it also highlighted to people that, for example, they were not just doing this outreach work part time; that was one of our main goals and they were fulfilling that, in just the same way as those who were doing the leading edge, publishing great papers. That is also one of our main goals.

Dr Goodwin—Picking up on that and on the evidence the committee previously heard: being able to say to researchers, 'Your project has funding this year to do this,' does have a very important role in focusing the researcher's mind. It really takes away any ability to justify—for example, 'I still need to be doing all of this earlier level research.' It says, 'No, you are now at this stage. We deem you to be at this stage. Your focus is the market. Your focus is outreach. Your focus is to really step past the discovery type of work and move on.' It is very clearly delineating that.

CHAIR—Is it the same group?

Dr Goodwin—Sometimes it is the same group of people, yes, because it may be that they have specialist expertise. Sometimes a change in leadership is very valuable at that point as well, to shift—

CHAIR—But do you actually move a whole division or just a component of it?

Dr Goodwin—The organisation operates on a matrix basis, so we fund projects and the people are in divisions. We do not actually move the people but rather what they are budgeted for.

CHAIR—So people keep on basically doing what they are doing, only you recombine in different forms?

Dr Bradey—You turn them into more multidisciplinary teams at that stage, with a focus on trying to move to much closer relationships with industry, so that you get that industry input and get the focus on it. The outreach is really to—

Mrs VALE—Is this the reason for this innovation of what we call a 'proto-company'? Is that different again or is that part of—

Dr Bradey—That is different again.

Dr Collins—That is, if you like, one of the outcomes of one particular technology developed within ANSTO, and the way it is moving forward. As I said, some of the things we develop and take out have not necessarily come just from ANSTO. This one did. We did the original discovery, the research, the patenting and now we are seeing where it can be applied. To help in its commercialisation we have formed a little spin-out company—at least, it is spinning, but not yet out!

Dr Bradey—You bring to it all the important governance issues and other things that they will need to understand to run a business, if it is spun out eventually. You incubate it or nurture it, in that early phase, as a virtual company or a proto-company, so that they get the understanding of governance and a lot of things other than science. Being more than a project, it becomes a business and it needs to be a platform technology.

Mrs VALE—So this is a really new initiative? This is really something quite unique?

Dr Bradey—For ANSTO, yes.

CHAIR—Can you tell us about Access ANSTO?

Dr Bradey—Access ANSTO has been newly established as a commercialisation arm of ANSTO. It has the aim of bringing a holistic approach to commercialisation. It will do that by looking at the breadth of services that are available at ANSTO and trying to make industry aware of those. It will try to improve and facilitate connections between ANSTO and industry, through providing services—for instance the neutron beam analysis work would be a service ANSTO would offer. It would also look to significantly increase the level of collaborative research because, as George was commenting before, it is important that we start on work that is relevant to industry, and that we have input from industry as to what sort of research we do and how we are going to develop it. The third arm is that, where intellectual property is created out of both the discovery arm of ANSTO and also the collaborative research arm, then Access ANSTO looks to—

CHAIR—Can you tell us how much you are spending on Access ANSTO?

Dr Bradey—It is about $1.2 million.

CHAIR—It is not that much.

Dr Collins—No, but ANSTO's total research budget is about $40 million, and that includes the support we do for others, so it includes all that work of commercialisation, marketing, and the work of going out there and building the bridges and channels both ways. That does not include, for example, the work we are doing in those business units that Danna mentioned; they are completely stand-alone business units, such as minerals and facilitating work.

Dr Bradey—It is just a small core team working across all the research to identify opportunities in it.

Dr Collins—And bringing in expertise.

CHAIR—It is not huge.

Dr Collins—No.

CHAIR—What is it—about 10 people?

Dr Collins—It is not even that—it is six.

CHAIR—You pay more than I thought!

Dr Collins—It also pays for the patent attorneys to help with the patents—they put their hands out too.

Dr Bradey—Also the key to it is that you cannot have all of the expertise residing in one or two people. By having a small core team you can also pull in people at the right time who have got expertise in a particular area. We have got commercialisation expertise and are really able to advance research projects a long way. But as you move to developing particular businesses, you need real industry experience and business experience in that particular industry. So, rather than lose our people, we looked to bring in external experts at that time to work with them and help float the business off.

CHAIR—I will not pursue that. Is there anything that you would like to touch on that you have not touched on? Do you have any last thoughts, or is there something about which you think, 'The committee is wrong about this,' or is there something else we should focus on? This is just an opportunity to have the last word.

Dr Collins—I would just re-emphasise relationships. Those who know us do not care that we have got an 'N' in our name. They look to what our overall capabilities are. Those who know us are our greatest advocates, and I think that would also be true for CSIRO and for others. It is important to build up those relationships with companies and communities, because they share information with each other; they say, 'Go to ANSTO for that,' or 'Go to CSIRO for that.' I think

that is a really important part of the innovation process. That is at their end. On our end, I disagree with something I heard before—I think the researchers enjoy the interactions and, as long as commercialisation is seen as a valid part of research, it is the one where you get to meet people. I used to work in more discovery research and I changed to more applied research. The thing I noticed was that the phones started ringing. I enjoyed that, because suddenly what I was doing was available for people. To get that two-part relationship working well is key to it.

Mrs VALE—I will also add, for Dennis's sake, that in my part of the world ANSTO have two or three open days where anyone, but it is mostly residents of the electorate, can come to visit ANSTO. The last time I think they had over 3,000 people visit. I know that on one occasion when Helen Garnett was in charge she let the little anti-nuclear group have their own stall at the open day. They had all packed up and gone home by 11 o'clock because they could not cope with the really positive vibes that were coming from everybody coming through. People bring their families, and it really is a great day. For someone like me who has no science background at all it fires your mind. It is absolutely amazing what is happening there. This is so popular in our local electorate. It is not just people from the electorate but people from all over Sydney that come to visit.

CHAIR—I hope that all of you live in Danna's electorate and do not just work there.

Dr Collins—I have the pleasure of living there as well as working there.

Resolved (on motion by **Mr Tollner**, seconded by **Mrs Vale**):

That, pursuant to the power conferred by section 2(2) of the Parliamentary Papers Act 1908, this committee authorises publication of the evidence given before it and submissions presented at public hearing this day.

Committee adjourned at 6.06 pm