CSIRO Oral History Collection

Edited transcript of interview with John Stocker

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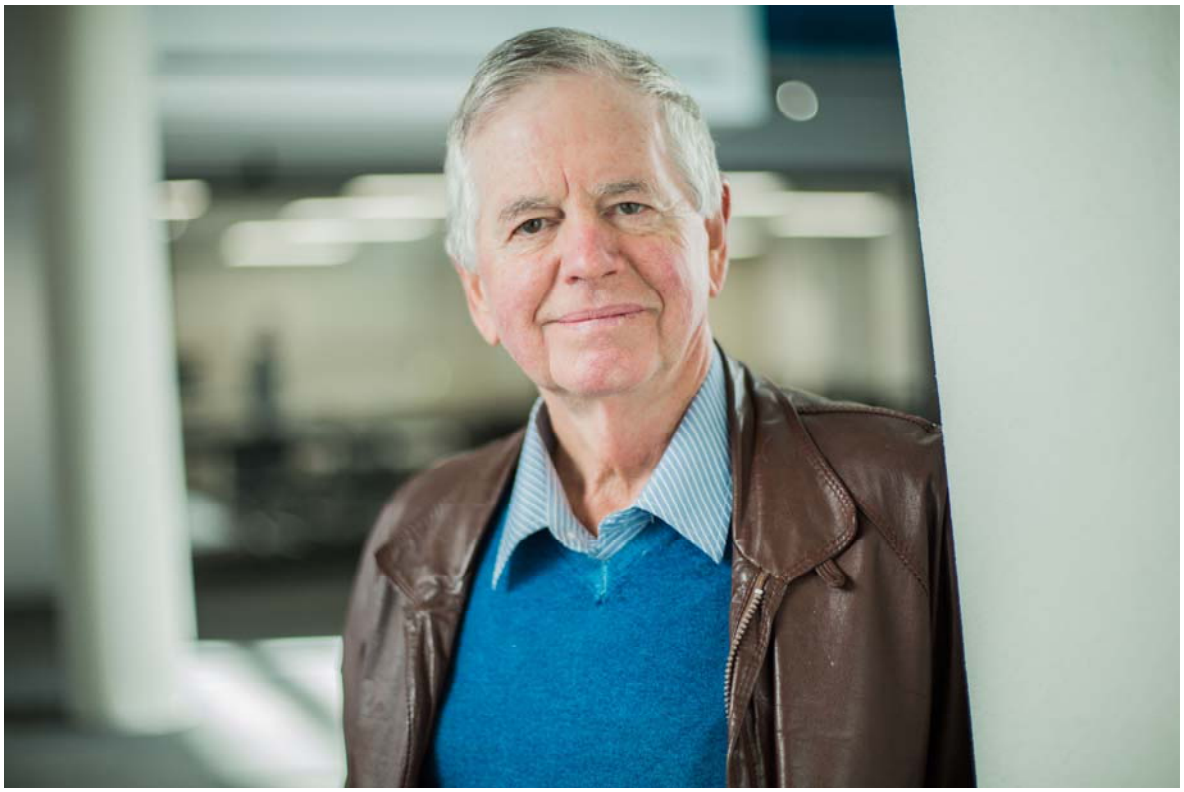
Interviewers: Tom Spurling and Terry Healy



Dr John Wilcox Stocker AO, *BMedSci, MB BS, PhD (Melb), FRACP, FTSE*

Summary of interview

Dr John Stocker was born in London on 23 April 1945. In the first part of the interview, he talks about his memories of London at the end of WW2 and of his family's decision to come to Australia in 1948. His mother was an Australian and prevailed on John's father to migrate to Australia as the General Manager of Johns and Waygood Ltd. John talks about his early primary school experiences at Malvern Hall and his late primary school and secondary education at Wesley College, where he was 'interested in everything'.

The next part of the interview is about John's time at the University of Melbourne where he obtained all of his degrees. His first experience of medical research was in the field of transplantation biology with (Sir) Peter Morris in the Department of Surgery at the Royal Melbourne Hospital, which was 'cheek and jowl with the Walter and Eliza Hall institute'. It's during this time that John met Professor Gus Nossal, who went on to have a great influence in John's career.

He talks briefly about his time in Basel at the Basel Institute of Immunology and then at Hoffmann-La Roche. (Note that this time in John's career is discussed in the Diana Giese interview[1]) and the decision to return to Australia as the Founding Managing Director of AMRAD. He outlines the role Gus Nossal played in that decision. John talks about the challenges of managing a small pharmaceutical start-up company and some of his achievements in the role.

The main part of the interview covers John's time as Chief Executive of CSIRO. This includes his recruitment, the challenges of managing the interests of the Government, the Board and the staff. He discusses the move of the Head Office to Melbourne, the winding up of Sirotech and the Chris Schacht intervention. He talks about his achievements in this role and his decision not to seek a second term.

In the last part of the interview, John talks about his time as Director of Research and Innovation at Pratt Industries, as Chief Scientist of Australia, as a Board member of various companies, including Telstra, and then as Chairman of the CSIRO Board. He concludes the interview by arguing the case for a national scientific research organisation like CSIRO.

[1] Stocker, John W. & Giese, Diana. 2000. *John Stocker interviewed by Diana Giese in the Australians of the year oral history project* https://nla.gov.au/nla.cat-vn1937132

NOTE TO READER

Readers of this interview transcript should bear in mind that some editing of the transcript, including additional material in the form of footnotes and endnotes, may have occurred at the request of the person interviewed.

Swinburne University of Technology and CSIRO are not responsible for the factual accuracy of the memoir, nor for the views therein.

Please note that the printed word can never convey all the meaning of speech, and may lead to misinterpretation. It is strongly recommended that readers listen to the sound recording whilst reading the transcript, at least in part, or for critical sections.

Introduction

This is an interview with Dr John Stocker for the CSIRO History Project Oral History Collection. It is the 25th of May, 2018 and we are in a recording studio at Swinburne University of Technology. I'm Tom Spurling and with me is Terry Healy. Thank you very much, John, for agreeing to this interview.

It's a pleasure.

Could you please confirm your understanding that Swinburne University of Technology will own the copyright in the interview material and that access to the material will only be given in accordance with the instructions you give us in the rights agreement?

That's clear.

On the 1st of June, 2000 Ms Diana Giese conducted an interview with you, John, for the National Library of Australia Oral History Collection. Her interview commenced in 1970 with you just starting out as a medical student at the University of Melbourne and ended in 2000 just after you'd completed your term as chief scientist of Australia. In particular, she explored in great detail your time in Switzerland at the Basel Institute of Immunology and at Hoffmann-La Roche and Company and a bit of your time at AMRAD. So in this interview today we're going to discuss some of your earlier memories before that interview, explore in more detail your time as chief executive, CSIRO, and then discuss some of your post-2000 experiences including the times as the CSIRO board chairman.

Early life in London and Melbourne

So, John, let's start at the beginning. Can you tell us a bit about your early life, your parents, siblings, primary school experiences, any outstanding teachers? I remember you were taught by our neighbour, Jess Boyd.

That's right, Tom. I was born in London at the very end of the war in fact in April 1945 and was part of a family that had chosen not to separate itself from its children during the Blitz, and my sister who's 10 years older than I am has very vivid and still has nightmares in her eighties of the events of the Blitz of the V1 rockets coming over. My dad was an engineer. He was not required to do military service because he had a job of strategic importance. He changed the direction of a company that used to make gas stoves to making war armaments for the military and so his position as manager of that company was a very important strategic one for the war effort and he chose to keep his family around him.

My very first memory is probably the leaving of London which I decided as important strategic decision for the family to effect in - when I was three and a-half, and the last thing the family did was to arrange a trip down the Thames to look at the houses of parliament and whether I can actually remember it or whether it's been told to me so often since I'm not absolutely sure, but I seem to have a view of Westminster from the Thames. We came to Australia, settled originally in North Balwyn and then my parents bought a house in Glen Iris where I lived really for the next 20 years of my life.

And what was your father doing in Australia?

Dad married an Australian and she prevailed upon him after the war when things were still pretty tough in London to migrate to Australia and he was offered a very good job as general manager of Johns & Waygood Engineering which was the structural steelworks which had built hydroelectric schemes, transmission towers, bridges in the days when most buildings were made of steel girders rather than reinforced concrete prevalent today, so Dad had an important job with that company and was very successful.

Is your sister still in Australia?

My sister is still in Australia. She lives on the Mornington Peninsula and she is a physiotherapist.

School life- Malvern Grammar School and Wesley College

And you went to primary school in Glen Iris?

I did. I went to Malvern Grammar School which is now Malvern Hall, a subsidiary of Caulfield Grammar School. The school was housed in a beautiful old building in Malvern and two memories stand out, probably from those days. One was a fierce teacher named Mr Skitch who used to walk around the playground with a stiff arm in which he had secreted a cane and he used to lash out at the kids in the days when lashing out at kids was still what you did. The other memory was one of the young sons of the Wirth's Circus family shimmied up the school flagpole to rescue a stuck Australian flag with all the children in the playground singing the national anthem, which in those days of course was God Saves the Queen. They were perhaps two things that stand out from that school.

Were you interested in science in Primary School?

I was interested in everything, Tom. I actually just enjoyed lessons and enjoyed learning. I enjoyed my teachers and very much enjoyed reading.

John, what about Ms Boyd? Was she at that school?

Ms Boyd was one of my primary teachers I think in the second grade and was a lovely lady. I had Ms Boyd, another Mrs Train. Mrs Train remained a close friend of the family for many years thereafter.

And what about your secondary education?

Well, at the age of 10 I went to Wesley College. The family had a very long tradition of MLC girls in Wesley College.

So your sister would've went to MLC?

She did and my mother and her mother and the boys of the family had all been to Wesley for quite a few generations and so it was pretty obvious that I would finish my primary education there and went through the secondary school as well.

That was the campus in St Kilda?

Yes.

Was that where you took up your interest in science or at school were you still interested in everything - at secondary school?

Well, the fact that I was interested in everything is proved by the fact that I did two years of matric. The first year I did all science subjects and the second year all subjects which would've led me to law which was then probably my preference, and so I did Latin, modern history, English literature, German and a lot of subjects which would have led me to humanities education, but the fact that in my first year I'd done well enough to get into medicine with physics and chemistry and maths kind of led me to a view that I could probably unfold my modest talents best in the area of science.

In all the reading that we've done about you Gus Nossal has had a great influence on your career but clearly you probably didn't meet Gus Nossal immediately. Were there other earlier influences in your late secondary school and early in your medicine degree at the University of Melbourne?

Yes. I'd probably picked three teachers at Wesley who were very important to me. One was my English literature teacher and he made Shakespeare's plays absolutely live and in a way that still excites me and so I still like to go to Shakespearian things. His name was Tosh Phillips. The two science teachers who had a big influence on me, one was Ken Merry who only died recently, and he was an inspirational physics teacher, and Mr Guess of course whose nickname had to be Havva and so Havva Guess was another great influence in those days. In fact, when I got first class honours in chemistry at matriculation level Mr Guess wrote me one of the funniest letters I've ever had because he said what a massive surprise it was to him, which wasn't terribly reassuring but it was good enough to get me into medicine.

What year was that, John?

That'd be '62.

Did Wesley good laboratory facilities for physics and chemistry?

Well, it acquired good laboratory facilities in that very year when none other when Robert Gordon Menzies actually turned up to the school and opened the new science labs.

He was a Wesley graduate himself, wasn't he?

He was a Wesley boy, yes, he was. He was a scholarship boy who got a scholarship from his home town of Jeparit to be at Wesley and he came back and gave a very funny and good speech and opened some beautiful laboratories which themselves were important because they were one of the early examples of a collaborative effort between the Australian Government and industry group and so they were jointly funded and that is a model that subsequently was lost but is I think at the moment being reborn.

So you benefited by those laboratories.

I did. The labs ere beautiful and they enabled us to have really good prac classes under safe and modern conditions and I do think that that was very important to have good school facilities. In fact now, as you know, I'm a director of the RG Menzies foundation and our new direction is about fostering leadership in schools.

Studying Medicine at the University of Melbourne

We might come back to the RG Menzies foundation at the end of the interview. I'd just like to ask you, John, about your study. You go to Melbourne University to study medicine. In your mind did you ever think that you were going to be a medical practitioner?

Yes, I did. That was the objective, although I must say I didn't have a particularly differentiated view of what I was going to be in life, which is just as well because I wouldn't have followed any of the directions which I've subsequently taken. But I did keep one little foot in two camps in that I kept my German going by going to the language labs at Melbourne University and availing myself of excellent language facilities.

Had you done German at matriculation?

Yes, right through school and I was interested in reading German literature and so when ultimately I ended up in a German speaking area it was a real springboard start.

At Melbourne University you did medicine but also medical science.

I did a bulk standard medical degree but took a year off at the invitation of one of the professors in fifth year to do a medical science year which was a year of research in transplantation biology.

Was Gus Nossal involved in that?

That was the first time my path crossed with Gus other than having sat through one of his totally inspirational and magnificent lectures to medical students but he took an interest in the research that I was doing when I took the year off with Professor Peter Morris who later became Sir Peter Morris, the Nuffield professor at Oxford, and Peter introduced tissue matching for kidney transplantation to Australia, pioneering a series of techniques in the Department of Surgery at the Royal Melbourne Hospital, and needed a young student and I was absolutely fortunate enough to be that young student.

John, did that then start influencing your view that you might go on to medical research rather than -

Yes. It was so exciting. It was so exciting being in the general orbit of the Walter and Eliza Hall Institute and of this great man Peter Morris.

Peter Morris was at the Walter and Eliza Hall?

No. Peter Morris was in the Department of Surgery at the Royal Melbourne Hospital but the geography was such that we were cheek and jowl with the Walter and Eliza Hall Institute and we had the opportunity to go to all of their seminars and lectures, and Gus Nossal often came to the presentations that we were able to give.

After you completed your medical degree did you then become an intern or resident and become a qualified medical practitioner?

Yes. I finished at the Royal Melbourne Hospital and I was lucky enough to top the year in medicine which again attracted Gus's attention fortunately. I think he had a very interesting recruitment strategy of scooping up the top student from Sydney University, Melbourne University, Monash and Adelaide University each year as his personal students in his lab, and I was lucky enough to scrape in to that through my finals results. I then did do a first year residency at the Royal Melbourne and in the casualty department met my wife Jo and then in my second year residency I was within the clinical research unit for the Walter and Eliza Hall Institute which had a ward in the university with Dr Ian Mackay, and by then I was well and truly directed towards a life of science and research rather than mainstream medicine.

So Jo was a nurse?

She was a nurse in the casualty department when I was a young resident.

At the Royal Melbourne Hospital?

Yes, at the Royal Melbourne.

And did you enjoy being in the emergency department?

I did. I actually enjoyed the bit of doctoring that I did for those couple of years, enjoyed it very much, and when it became clear that I was going to be poor and not wealthy like other doctors, I was able to do locums in the country for three months of the year to earn enough money to finance my PhD studies and so I used to go to Wangaratta and work in a general practice of the year and earn enough to feed myself for the rest of the year.

For how long did you do that?

A couple of years while I was working in Gus Nossal's lab.

When did you marry Jo?

In 1973.

While you were a student still?

PhD with Professor Gus Nossal

Yes. In fact, that would've been my first year in the PhD study with Gus Nossal in his lab.

Very good. Were the children born in Australia?

No, they were born in Switzerland. After my doctoral studies we looked around at the various options that were available. Most people tended to go to the United States in those days, to Stanford or to Harvard, or others of my colleagues went to the UK. My interest in German and Jo's

interest in German too because by complete coincidence she'd also done matric German and the fact that we thought that the cultural experience of a completely different culture would have been very interesting and stimulating, for those reasons and as a consequence of Gus being a member of the Scientific Advisory Board of the Basel Institute for Immunology, he was able to write a nice letter to the Nobel laureate Niels Jerne who was then the head of the Basel Institute, the director, and I was accepted as postdoctoral student there for a two-year period.

Post-doctoral work in Basel

Was the Basel Institute of Immunology connected to Hoffmann-La Roche?

Yes. It was founded by and fully funded by Hoffmann-La Roche as a totally altruistic venture of pure science. Later Roche started to take a much closer interest in whether it could get some commercial benefit from it, but initially it was set up as a pure basic research institute.

And when you went there was it still a pure research institute?

It was.

And what was your impression of the culture of medical research in Basel compared to the culture of medical research in Melbourne?

It was pretty similar, but the Basel Institute had a very odd system where it was every person for himself more or less and you weren't taken under anybody's wing or given a direction. It was you were thrown into the deep end of a fairly deep pool and expected to sink or swim, and it took me a little while to find a niche for myself there and to find a group of people with whom I wanted to collaborate, but in the end again it was the interest in trying to apply science to human medicine that convinced me that the brand new area of monoclonal antibody technology and its potential application to human disease was what really I wanted to spend my time doing.

Career at Hoffmann-La Roche

John, as I've said in the introduction to this interview, the National Library of Australia interview does discuss your work at Hoffmann-La Roche in great detail, so listeners to this interview who want to know about that should listen to the National Library interview, so we won't discuss that in much more detail now. But we would like to talk to you a bit about your decision in 1987 to give up an opportunity to become a director at Roche and to come back to Australia to run what was a tiny little pharmaceutical company called AMRAD. Can you go about that? Before you do that I'd just like to mention that when you read the National Library interview it does record how much your whole family is involved in decisions that you make, so maybe you could discuss that a bit in relation to this decision to come back to Australia.

It was a very hard decision, Tom. I did have a job that was really at the crossing point of the trade routes of world pharmaceutical science. I mean Roche was a marvellous innovator and my job was such that I had duties in Japan in the Roche laboratories at Kamakura, in Nutley, New Jersey and in Roche Basel, and some of the very best pharmaceutical researchers in the world were in those centres, and so the decision to forego that and a pretty comfortable and lucrative lifestyle was one we took as a family, as you said. Jo and I really looked to Australia still as a land of great

promise for raising kids and for giving them excellent opportunities and also we decided that we would not just make one decision to accept the offer to take up the CEO job at AMRAD, but we would make two decisions.

The second decision was we would never regret it, and so we defined out of the possibility looking back over our shoulders and whinging for the rest of our lives that we should've stayed on.

Can I just clarify with you, John, at that point in your work with Roche you were more of a manager than a scientist.

Yes.

Transition from scientist to manager

And can you reflect at all on your views about a life and a career as a manager of science as opposed to a practising scientist?

Yes. Well, that was a tough transition, Terry, because I had a lab which was pretty active and was doing interesting things and I really enjoyed the hands-on daily looking down the microscope and doing tissue culture work, but by the time my career at Roche rose at a rate that nobody, and particularly I, wouldn't ever have predicted and suddenly I was in charge of initially 20, then 100, and then 1,000 people as director of research and of course there was no way that one could continue to pretend that one is doing anything useful with a full day of personnel matters and securing the funding and assets which were necessary to nurture a scientific effort, and so really from that moment to the rest of my life I haven't done any significant original science. I've benefited and relished being close to it through the work of others, but my job from that moment on really was to ensure that the ground conditions were present for other people to unfold their own creative potential.

And as a manager you did a lot of things that general purpose managers do, but you were scientifically informed. In other words, the people that you were managing as scientists had the benefit of having someone managing them who actually understood what they were doing. Was that an important part of your role?

Yes. Kind of you to call it a benefit. Some of them would've probably preferred a greater distance between me and their work, particularly when we were having to make some really tough decisions about areas of research that perhaps weren't showing much light at the end of the tunnel as commercial projects of potential for the company and so closing things down was from those very early days quite an important part of a very difficult job. Also finding the resources to open things up was the nice side of that, but it was always really, really difficult to try and motivate a team of chemists who'd been working on a particular set of compounds.

Prostaglandins were one area that I remember very clearly where this very good team of very excellent chemists had been working year after year after year after year with really nothing showing commercial potential for the company, and so finding ways of motivating them for a different direction in chemistry was a big challenge.

What was the disciplinary base of your group in Basel? You say they were chemists, but presumably there were people from other disciplines as well.

Yes. The disciplinary base of the large department was chemistry and biology, so the chemistry of discovering and designing new compounds. Rational design was just at its infancy in those days, and then the biological testing of those compounds in biological systems, both in tissue culture and in animal experiments, that was the bulk of the department. But then my span of control also included the three important parts of pre-clinical drug development, namely: toxicology; pharmacokinetics; and formulation of the drugs. All of the activities from the moment of discovery of a compound until it went into the clinic were under my control by 1987.

And was there a group of protein crystallographers there?

Not at that point. No, that was the next big stage, although we were already starting to collaborate with some external rational design people who had crystallographic capability.

And did you have any responsibility for intellectual property protection at that point?

Well, we certainly had a very big responsibility to liaise very closely with the large and highly skilled patent department in Roche and I'd had personal experience of a few inventions of my own and the pedantry with which I had to haggle with these patent attorneys about additional experiments they required which struck me as having no scientific merit whatsoever but which were necessary in order to complete the patent applications. In fact, one nice little story. I invented a new method of blood typing, of blood grouping, and it was submitted by Roche to the European Patent Office in Munich and was flatly rejected as being something that wouldn't work and so I was affronted by this and went to the patent department, scooped up the patent attorney.

We got on a plane, we went to the patent office, made an appointment. I took the whole gear with me and actually demonstrated it to this rather bewildered German attorney in German and showed him it did work, following which he granted the pattern. That actually happened.

Chief Executive Officer at AMRAD

John, we're now back in 1987 and you're coming to Australia to become the chief executive officer at AMRAD. Was Gus Nossal involved in that decision in some way?

Hugely. Hugely. Gus had been consulted by the Department of Management and Budget who were working to Premier Cain at the time to try and build new more innovative industries in Victoria, and the medical research capability of the state clearly provided what they thought would be a very good starting point for a number of new industries in the pharmaceuticals and diagnostics area and for that reason Peter Sheehan, who was the head of that Department of Management and Budget and his team of people around him, canvassed all the medical research institutes to see whether they would be supportive, and nearly all of them were on the basis that they get some extra funding from the government, which was clearly the carrot that was being presented.

In those interviews I think they already started wondering about who might lead up this enterprise and Gus remembered me as his student and already started quietly corresponding to me that stirrings were afoot to kick-start this new company. Would I have any interest at all? That was the very first sign or first thought I had that there might be an opening in Australia which would

enable repatriation of the family.

How was it sold to you?

It was sold to me as a huge opportunity and something that would be utterly different from the life that I was leading in the big company where everything was turned on, a vast office with a big desk and lots of minions. This would be jumping out of the ocean liner into a tiny canoe, and that had some appeal.

And you obviously haven't regretted that decision by definition, but if you'd started yourself with this idea, would you have had AMRAD or would you have done it in a different way? If Peter Sheehan had consulted you earlier would you have had some different view?

Peter Sheehan and his team hired PA Consulting to do a rudimentary business plan for this new company, and when I looked at the business plan, having accepted the job, I did decide to start again because the business plan struck me as being based more on theoretical considerations that on any practical commercial likelihood of an outcome and so I did have the luxury of the opportunity to write my own agenda and that I appreciated greatly.

When you came back to Australia you'd been essentially at the centre of world pharmaceutical research. You returned back to Melbourne which is arguably the centre of medical research in Australia. What was your impression of the state of Australian science at that time?

The science was excellent. The naivety with which people were approaching the idea of commercialising that science was equally difficult and particularly the lack of any infrastructure to cause ideas to move along the tortuous pathway to commercial success. Whereas in Europe and in the United States and in the UK there were big drug companies with all of those infrastructural elements in place. Australia then and to much extent still today lacks those pathways that can pull products through these difficult things, and that was always an impediment to the success and remained it despite the best efforts of AMRAD which eventually was however swallowed by CSL Limited, became part of CSL Limited, and that was probably the best outcome.

I had a different outcome in mind and approached the government with the help or Neville Wran and Bill Scammell who was then the CEO of Faulding's. We had it in mind that little AMRAD would take over CSL and privatise it, but that wasn't to be.

Can you just elaborate a little bit on this pipeline of activities that are necessary to take really good science into the commercial practice? What do you see as the components of that framework or infrastructure?

The main component is experienced people, people who've done it before and because Australia really hadn't in those days had any experience of major drug development, that experience base was totally lacking but, secondly, you just need the regulatory framework and the framework of ethics committees and hospital experienced at doing clinical trials and professors who wanted to work closely with a company in those endeavours. All of those things in those days were lacking, somewhat less today, but still it isn't the same mesh that exists between a large European company and the university communities and the hospital communities, and for example in the department that I ran we had eight people with the title of Professor working on our staff and as adjunct professors to major European universities right throughout Europe and that allowed the

kind of connection and links that facilitated greatly all the other steps required in drug development and of course massively increased the reach of the company into the academic community.

The US is fairly famous for giving commercial opportunities to academic staff. They can get rich and are quite conscious of it. That tended not to exist in Australia at the time when you came out. To what extent do you think that is important?

I think it is important for the US model. The European model that I experienced was slightly different in that people were often university professors but fully paid for by the company, and that's a different model again. It was less usual for them to have equity in start-up companies, but that occurred, and I guess the most interesting experience of drug development from the very beginning, a commercialisation of an idea that I ever got involved with, was a little bit later when I became a director of Cambridge Antibody Technology which is a spinout from the Medical Research Council of the UK based on a completely revolutionary set of ideas about how to make monoclonal antibodies.

And that company was very successful, largely because the Medical Research Council of the UK having noticed how Britain had missed out on cashing in on the Milstein and Kohler Nobel prizewinning invention of monoclonal antibodies thought they might have another opportunity and for goodness sake, that would've been politically too difficult to miss out a second time. For that reason the MRC was quite amenable to proposals that a company should be formed in the UK based on this technology and would have all the intellectual property rights to develop it, with some kickbacks clearly to the MRC, but it was a good model and it worked.

Individual professors and others could actually get rich in that model?

The people in the company got hugely rich. The young man who is the medical director who was a car freak and an impoverished scientist like the rest of us ended up with a double garage with two Ferraris.

That says it all.

John, going back to AMRAD, what would you say were your achievements at AMRAD?

Interestingly, the main achievement was probably having a business model that enabled the company to be profitable even before any of its own products were on the market, and we formed a link with Merck Sharp & Dohme, and the CEO of Merck Australia, one David Anstice whom I approached, immediately liked the idea that AMRAD would be a second marketing division for his company to seel Merck drugs under AMRAD's trade name and AMRAD packaging to doctors and the proposition was that in prescribing these drugs you would be supporting Australian medical research and the formation of a new company. So apart from the straight science that we were backing and developing, we were able to have quite a significant cash flow coming in and a workforce of drug representatives all over Australia visiting doctors and selling these drugs with what I thought was a good story.

That workforce, were they AMRAD employees?

Yeah. The company was AMRAD Pharmaceuticals and it was a wholly owned subsidiary of AMRAD

Corporation.

And that was not a distraction from the role of developing new products?

It was an adjunct to it and I thought and still think that any pharmaceutical company that is just doing research is a bit too perilously perched on one rail. We were trying to have two rails.

John, this is not in my script, but I've just thought of it. As the chief executive of AMRAD, I can remember you visiting the CSIRO Division of Applied Organic Chemistry to try to develop a link with some chemists. Was part of your job - did you see part of your job as developing links with the non-medical academic community, and how did you go about that?

Very much so, Tom, and it was very interesting that that particular visit led me first to have interaction with Neville Wran, which of course led ultimately to my appointment at CSIRO, so it was a pretty tenuous thread back then but that's what it led to. I mean clearly I'd been used to a life where chemists were a very important element in all of the drug development process. The AMRAD experience with the medical research institutes is almost exclusively the biology side, and so it's pretty obvious to reach out to try and form some links with the chemistry community and the divisions that you were then, I think, assistant chief or deputy chief, was an obvious point.

Getting back to your experience at AMRAD, looking back on that, what did that teach you about the role of state and commonwealth governance in science and innovation?

I was certainly impressed with the enthusiasm and raw energy that the state in those days was demonstrating in support of the idea of building new industries on the basis of the intellectual platform that Victoria had in its medical research. There was great enthusiasm. The state bank was going through all sorts of interesting gyrations. The VEDC was about to fall over the precipice. It was a very adventurous rather cavalier time in the state's history and the time in the sun was pretty brief and pretty limited and the Cain government suffered quite an abrupt setback as a consequence of that. It was all very well intentioned and some of the efforts and including, I would say, AMRAD did bear fruit but like so much in venture capital in the private or public sector, much of it is doomed to failure and Australians tend to tolerate failure rather less than people in communities like Silicon Valley where you only expect one start-up in five to really hit its straps.

Did you have much interaction with the state government bureaucracy?

Yes. And in fact my office was in the Treasury when I first came back. Rob Jolly was the treasurer of Victoria. My office was next to his and so I was actually deeply embedded in the bureaucracy geographically. I didn't want to be embedded in any other way and soon we started thrashing around to find offices that would be a bit more remote from the bureaucracy and we moved to Kew.

And the commonwealth, was that at all active in your space?

Yes. The commonwealth was wrestling with - and through John Button and his department were wrestling with very similar ideas of commercialising medical research and there was a move in the then department which was called DITAC, the Department of Industry, Technology and Commerce. There was a move to try to convince the Health Department to reward pharmaceutical companies with better pricing if they would be prepared to do more of their

research and development in Australia. The spat that that led to between the different factions in the bureaucracy, one of which wanted to keep drug prices as low as possible in Australia and the other one wanting to develop industry, led to not much happening.

[INTERVIEW INTERRUPTED/RESUMED at 00:43:30]

Recruited to be Chief Executive of CSIRO

So we're now resuming our interview with Dr John Stocker and we were just - before the break we were talking about John's experience at AMRAD and the role of state and commonwealth governments in science innovation, but now we'd like to talk about your decision to take up the position of chief executive of CSIRO and how that came about, who was involved in it, why you decided to leave AMRAD and come to the CSIRO.

Tom, I'd always been a very strong admirer of CSIRO, and that goes back to childhood days when before television we used to listen to the ABC and Ian Clunies Ross was on very many of the panel programs and seemed to have a prodigious general knowledge and an enthusiasm which for a 10 or 11 year old was quite contagious and so I'd known a bit about CSIRO through those exposures and also through school textbooks where we read about the famous triumphs of rabbits and prickly pears and trace element deficiencies and all the challenges to which the organisation had bent its mind. I was off to a pretty strong start of admiration when I started getting into discussion with Neville Wran who was the chairman of the organisation and who encouraged me to express interest in taking on the role.

In addition there were two further links. Ralph Ward-Ambler was on the board of CSIRO and was my chairman at AMRAD and so that was a fairly close link, and Gus Nossal, my lifelong mentor, was also at that time on the board of CSIRO, so I had some pretty strong connections even before the role of chief executive was offered to me.

Would you say that you were headhunted for the job?

It was less obvious to me that there was anything formality about the search. It was an extraordinarily informal process in that the further I got talking to Neville Wran the more I got interested in it and then he said well, would I present myself for an interview, which I did in his office in Sydney, and the other people who I recall being there were Tony Gregson and Adrienne Clarke and we had a good discussion and then a few days later I got a call and then an email formally offering me the job on CSIRO notepaper with the chairman as the signatory, and I'd said I was flattered and delighted and I'd consider it.

And then, as I think I've told you before, a few days later was very surprised that the minister Barry Jones called me and said they were considering offering me the job, and I said, "But, Minister, you already have." He said, "I haven't and it's my call," and I said, "Well, the chairman of the board's written me a letter," and he said, "Send me that letter," which I then did by fax and then Barry and I met in Florentino's in quite a difficult set of circumstances which resulted in him demolishing two T-bone steaks one after the other and I had a lettuce leaf and even didn't digest that particularly well, from memory.

So in fact, the minister was correct that it was - the legal position was that it was a governor-general and council appointment that had to go through cabinet.

That's right. But the process was sort of circumvented, curtailed and corrupted in the way that I've described.

So Tony Gregson, who we're also interviewed for this oral collection, says that he can remember the interview quite well in Neville's office in Sydney. "And John Stocker came in," says Tony, "and John Stocker just laid it out like you wouldn't believe. I remember Neville saying, 'Well, that's that that then, isn't it? How could you not appoint this guy?'" -

Fortunately they did believe it, Tom.

- "He'd done this, he'd done this, he'd done this. He just laid it out. It was unbelievable. It was one of the best interviews that I've ever witnessed."

Well, that's a nice recollection. I don't have that level of recollection, but it did result in a very happy appointment.

So you prepared for the interview?

Yes, I did. I'd obviously read up. I did the due diligence that you'd expect a candidate to do who was seriously interested in the job.

In the interview that you did for the National Library, Diana Giese says of CSIRO, "It was a bit of a mess. People were very demoralised." In that interview you say, "This isn't true," so what was your sense of the morale of the organisation when you came into it in 1990?

I'll answer that on two levels. I believe that the morale among scientists getting on with their science was excellent and I've never been suddenly catapulted into the midst of a group of more motivated people who really believed that they were doing important things for themselves, but more importantly for the nation. So in a scientific sense I think the morale of CSIRO was excellent. I think the management structures and particularly the relationship between the board and senior management could well be described as having been in a mess. The fact of the board office having been separated geographically from the management team in Limestone Avenue, board office in Civic was a reflection in my view - and that was backed up by a number of discussions I had with people - of a deep distrust that had developed between the board and senior management.

That wasn't just a view that I conjured out of the air. It was explained in similar terms to me by the chairman at the time and he said, "You've got to do something about this because we're really got to get the thing together again," and I think if you look at the very first piece I wrote in CoResearch in April 1990, I've pointed out that I thought that that would need to be restructured and that the board office would have to be brought back to become the office of the chief executive and board, so we looked as though we were one team rather than having a pope in Rome and pope in Avenue which was the great schism of the organisation when I first joined it.

When you say 'brought back', the board office was always in separate. I think it started being separate.

Well, I don't know for how long that had been the case, but I saw it as anachronistic and as a complete disjunct between the trust that the board should have in the management which would

mean that the office of the board and the board secretary should be extremely close to that of the chief executive. Otherwise, you really do risk having two separate seats of power which at the worst fight, at the best don't talk to each other.

I was the chief of the Division of Chemicals and Polymers at the time of your appointment and I can remember the general reception of the news that you were going to come as the chief was very well received. Especially the chemists of the organisation were very pleased with this appointment, so I was a bit surprised when I heard in that bit in the interview that the organisation was a mess.

Well, they weren't my words. They were hers.

Yes. You mentioned that a main issue that Neville Wran and the board discussed with you was this schism between the board and the senior management. Were there any other issues that the board wanted you to address when you came into the organisation? What were your instructions, as it were?

Well, there were very many marching orders because I think the board felt that for a while their wishes and initiatives hadn't necessarily been taken to heart by the management of the organisation, and so perhaps just at random some of the things that were thrown at me were, firstly, the top heavy nature of head office and the large number of staff that the board perceived as being perhaps excessive in terms of managing the organisation. Neville had a particular bee in his bonnet about the power of the chiefs and the fact that the College of Chiefs saw itself as a third seat of power running the organisation, ignoring completely the role of the other two seats of power and Neville said, "There's this group that calls itself the College of Chiefs," and he said, "Get rid of it." And so that was another very straightforward marching order.

I felt that the board strongly supported a management style that I had from the very beginning which was to get out and actually be seen and talk to the staff, and I made it my objective to do something that I don't think had been particularly prevalent among my immediate predecessors of getting out, and I tried to visit all 106 different sites around the country within the first 18 months. I got to nearly all of them and had the chance then to have unfiltered feedback from staff members at all levels in tearooms and in labs - and particularly in labs with people explaining what work they were doing, and that seemed to go down pretty well received. Perhaps the last specific mission the board gave me was to start a process of focusing the organisation's excellent capabilities on fewer problems.

My own recollection of this is that you were going down to Clayton to visit the Division of Chemicals and Polymers and that was I think the first time a chief executive had visited the division in that way. Other chief execs had been there but not in the sort of informal way that you had, and I can remember you playing table tennis with me and other scientists at lunchtime.

And I would have preferred to win those matches, Tom, but it was fairly undiplomatic not to allow that.

Anyway, so in a large part scientists are driven by strong cultural incentives to advance science within their discipline and publish their works in prestigious journals, but within CSIRO scientists have to also perform their duties in accordance with some national priorities determined by the senior management and probably Neville Wran had the impression that the scientists were doing the first more than the second, and so this sort of cultural difference in a way presents a problem

that has to be carefully managed. If it's done it's obviously a win-win situation for both the organisation and the scientist and the country, but it can create conflicts. This sort of notion of organisational cultural change, how much did that figure in your thinking and the board, the minister and the executive?

It figured very strongly, and I think that the so called national research priorities exercise that we jointly took on together in those early months of my term was quite pivotal actually in leading a change in direction of the organisation away from one scientist per project to a focus of more minds on common objectives and just the exercise itself of developing a framework for assessing national research priorities. CSIRO actually taking the high ground and usurping the role of being able to state what it thought the national research priorities were, that was important too, and the bureaucracy of Canberra responded very well, I recall, when I invited the senior bureaucrats to a morning tea at Limestone Avenue and to my surprise they all came: the head of the treasury; the head of finance; the head of the environment department; the head of the industry department. All the mandarins were there gathered in a room for the first time and seemed to resonate quite strongly with a direction which did suggest that there was a more strategic approach being taken to the expenditure of the resources invested in CSIRO than had been the case. That, I think, stood us in good stead during budgetary rounds for the next few years.

National Research Priorities framework

John, I'd like to spend a bit of time on that, the notion of national research priorities, because when we read the minutes of the board meeting, the first board meetings, and when Keith Boardman was the chief executive the idea of CSIRO developing national research priorities was the first thing on the agenda in 1987. I as a chief of a division didn't know anything about it, so it was a process that the board was obviously very interested in right from the start but until you became the chief executive it failed to gather any momentum within the organisation. In looking at the organisational inertia and the way that large organisations go, can you think back and just talk to us briefly about the way that you succeeded in this national research priorities exercise where others had not succeeded?

Tom, I think the team of the executive committee of the institute directors warmed strongly to the idea that they and we collectively as a team could take leadership and be seen to take leadership in this area. The whole thing probably had been a bit rudderless for lack of a framework in which to consider this because it's an ineffably complex problem how you compare the apples and pears that exist in the whole panoply of potential research projects and come up with an ordering of them in some way that's useful, and that was difficult for all of us. I certainly didn't have an immediate solution, but it seemed to fall into place on the goodwill of that team and also with the intellectual input of the people that we charged with helping us develop a framework.

You were one of those people and as were the institute planners, people like Ian Elsum and Andrew Pik, and they seemed to respond and resonate very strongly too with having been given this challenge, and Don McCrae our planner was involved also, so there were a lot of involved in helping present to the executive committee a means in which we could classify research purposes through the Australia Bureau of Statistics socioeconomic purposes framework and use an attractiveness feasibility frame and it led to what were some of the best meetings I've ever been to in any management structure with quite palpable enthusiasm on the part of the executive committee members each presenting their thoughts and ideas and coming to a consensus. The most surprising thing perhaps was that we did come to a consensus about the areas that were

likely to have the most impact and be most propitious and most prospective for CSIRO to pursue.

John, what were the long-term effects of this national research priorities exercise?

Well, I'm pleased to say that there are some. It didn't all just sink into the sands of time, which it might have. Twenty-five years later we can say the wireless project was a direct consequence of Bob Frater presenting the beautiful work of John O'Sullivan with the Australia telescope chip and the Fast Fourier transformation mathematics which underpinned the inventions that hadn't yet been made but which predicted that wireless signals one day would be as scrambled and as complex as the signals that the Australia telescope was receiving from outer space and that we would need something very similar, so one of the things we backed with real funds as a consequence of the national priorities exercise was that.

Another was mine site rehabilitation which led to some big contracts in Australia and China and led to the Australian mining industry, which had been a bit disillusioned with CSIRO and its service coming more onside and supporting us, there were a number of things which arose from it and I would perhaps - well, no, not perhaps - I would certainly point to the later development of flagships and concentration of research around a fewer number of purposes as being a direct legacy of that early exercise when we did break the mould of one person per project and developed that concept. We called it multidivisional projects. It later became called flagships, but they're the same thing.

John, how did that national research priorities exercise help you in fulfilling Neville Wran's instruction to break the College of Chiefs?

It helped a lot because it resulted in us being able to do some fiscal management of the organisation which hadn't been a feature. The distribution of funds and resources had been according - perhaps this a cynical way of putting it - but it had followed the most strident voices rather than perhaps the most important national opportunities for some time and we, as you'll recall, levied a tax on the whole organisation which gave a fund which could be administered specifically to reward those divisions and teams that were involved in multidivisional projects which matched the national research priorities. That necessarily of course weakened the position of strength of some of those strident voices, but I think it also gave us a management structure that was more likely to follow a strategic patter rather than a random walk.

John, that sounds very civilised. Was there in fact some rough and tumble?

Yes, there was some rough and tumble, and there were some people and some chiefs who decided not to renew their appointments and there was - but not - less than you might have expected. There was a bit of that, and I think again if you look at some of the editorials that I wrote in the time trying to explain to the organisation what we were doing with this national research priorities exercise, I was at pains to explain that I didn't think it was particularly creative. The creativity happened at the fringes of the organisation. All we were doing was trying to find an enabling system for nurturing the best ideas where they matched with the national priorities. I think that explanation calmed down some of the criticism of managerialism suddenly kind of contributing to the CSIRO logo which was famously interpreted of course as the bars of bureaucracy in front of the light of science or blocking out the light of science, so I think that alleviated some of those concerns when we explained it. We weren't pretending that we were making any great invention. We were just trying to provide an enabling environment to back the

best ideas.

So we're back again after a brief break for a battery trouble. John, I'd just like to put a proposition to you. I was a member of the College of Chiefs and I recall thinking that as a chief why did I participate and I think my recollection is that I thought that my views were being ignored by senior management, so in some ways the chiefs got together because it seemed to us at the time to be the only way that our views were in any way crystallised and put to the senior management of the organisation. When you became the chief executive and your program of visiting everybody made the College of Chiefs in some ways irrelevant, so can you - so part of your -

That was part of the objective, Tom, and I'm glad to hear that you've put that interpretation on it. My management style, developed already in Switzerland, was to be far more close to the action than others did, and part of that is simply that I get my best information directly from people rather than from reading it on briefing notes, and I think it was very useful to be able to waft around.

The slogan 'Australian science, Australia's future', was that your idea?

Yes, it was, because we needed a succinct way to promulgate what we do and why we do it, and I think it said it reasonably well and it provided a simple slogan for the initiative that I called 'Project Ambassador' which happened a couple of years into my tenure where it became very clear that CSIRO's funding base was going to depend on the decisions of politicians and the decisions of politicians depend entirely on what the electorate thinks, and therefore reaching out to the electorate and providing a bit more information and knowledge about what CSIRO is up to was very important.

[INTERVIEW SUSPENDED/RESUMED at 01:09:36]

Interactions with Ministers

Thank you, John. We're now back having our discussion after lunch and we were talking about Australia's science, Australia's future and that was your idea to portray to the Australian people the importance of science and technology in the future of the economy of the country. About that time you were made Australian of the Year by "The Australian" newspaper, so how did that come about and was there some process for that or was it out of the blue?

It was pretty much out of the blue, Tom, and it was very flattering and pleasing. I think Julian Cribb had a lot to do with it, talking to his editor of The Australian newspaper and Julian, as you know, was a very powerful and successful science writer and was deeply interested in CSIRO and subsequently joined the organisation.

Yes, he did, and made a big contribution to publicising the achievements of the organisation. During your tenure as chief executive I counted that you had five ministers: Barry Jones; Simon Crean; Ross Free; Chris Schacht; and Peter Cook. The first three of those were junior ministers in John Button's portfolio, so John Button was the senior minister. Chris Schacht was the junior minister when Alan Griffiths was the senior minister, and Peter Cook was the first of your ministers who was actually the member of cabinet and in charge of science. Can you just talk about how you developed relationships with the politicians and with the bureaucrats and how that whole CSIRO

head office government relationship went about?

It was a bewildering succession of ministers and I'm not absolutely sure that you're right in that Simon Crean was a pretty senior minister when he was minister for CSIRO. You're telling me he wasn't in the cabinet at that stage, okay, I accept that. Look, the first thing we did for each of them as they took on their new role was to offer some staffing support for the new ministers going into their job as a means of assisting them to hit the ground running, and some excellent people from head office went on secondments briefly to set up the ministerial offices when they took on their new appointments. That was accepted warmly and gratefully by all except Senator Schacht who rejected it on the grounds that it was implanting a spy, as he put it, in his office, which was a rather disappointing response, but the others all seemed to benefit from it and we had very good relationships in general. Each of the ministers had their own particular slant and contribution, and I particularly appreciated the intellect of Ross Free in the job coming from a teaching background and a deep respect from science, Simon Crean who had also a close personal interest in what CSIRO was doing, Barry Jones of course is a legendary polymath and somebody interested in everything, and all of them, I think, came to the job with the right level of enthusiasm and curiosity.

John, did they have any riding instructions to you how they saw the organisation develop or were they above that?

They were all above that and were all able to interact and to take the time to find out about the organisation and to make their contribution in a pleasantly interactive way, except Senator Schacht, and famously we had a difficult relationship with that minister from the very beginning when we tried to help with the office but then it became a lot deeper when he rolled out some of the ideas which later took on quite a bit of notoriety in his objectives to hive off a chunk of the organisation including the Division of Atmospheric Physics and the two marine divisions and to consider putting ANSTO into CSIRO. All those initiatives seemed to most of us within the organisation and particularly to the board, to be rather ill thought out, ill considered, and we pushed back on all of those fronts.

Was that proposal a surprise to the board and the organisation at the time?

It was an unwelcome surprise.

My recollection was that there was some report that he was looking at but you think it came from people in his office.

I believe that much of the initiative did come from a think tank within his own office, yes.

And what about your relationships with the senior bureaucrats in the industry department, the health departments, other agricultural - other departments that had an interest in the activities of the organisation?

They were generally pretty good and I felt that I had adequate access and was adequately consulted, so the morning tea that I drew reference to earlier which was at the beginning of my tenure and was a suggestion actually from David White who'd been the minister for health in Victoria was I think a way to break the ice and to introduce myself and the organisation to the mandarins and it proved very invaluable in later years when one needed to pick up the phone to

these people.

The fate of SIROtech

I think that we'd like now to go into more detail about some of your work during your tenure as chief executive. We have talked a lot earlier about the national research priorities exercise, so we won't do that, but the other topics that we'd like to talk in detail about are Sirotech, the role of the CRCs and the move of the head office to Melbourne. We'll talk first about Sirotech if you can and within the discussion of Sirotech we'll talk about the whole issue of commercialisation and the links to end-users that are related to this. First of all, when you came into the organisation was there some discussion with the board and the minister about the role of CSIRO in the commercialisation and innovation?

Yes, Tom, that had been a topic that had been centre of mind for quite a while for the board before I came on board and I believe that one of the reasons that they looked outside the organisation to someone coming from industry was because of a concern that that issue had not quite been addressed in the way that the board was hoping. When I came in and I saw [Sirotech] and I saw it as a very well-meaning attempt to centre some experience and expertise in commercialisation in a company that would then serve the organisation to help it with its business links, its contractual links, its intellectual property management and potentially its equity in spinout companies.

All of those things were well meant and there were some very capable people associated with Sirotech. I was in fact made chairman of the board of Sirotech in the early days. But as the months rolled by, a lot of concern was being expressed to me, particularly by people outside the organisation who'd been dealing with Sirotech, that rather than being a conduit between the organisation and its science and industry, it was in fact the bottleneck because, as Colin Adam once put to me, it was a million dollar company with a $600 million research department and that symmetry of that was obviously missing.

The model that seemed to emerge as the most successful model for CSIRO was actually decentralising the expertise and the obligation and capability of dealing with companies to the divisions and to the institutes and that each of them would provide a more immediate interface with the companies that they served than an interposed in Sirotech and for that reason the more we looked at it and the more the board looked at it, the more we formed a common view that perhaps Sirotech, though a useful and meaningful experiment, was one that perhaps should be subsumed into an obligation on the whole organisation to form commercial relationships.

So when Sirotech was started, the organisation didn't have the 30% external earnings requirement but when you came on as chief executive I believe that 30% external earnings had been imposed.

Already, yes.

What difference did that make on the whole commercialisation legal matters that the organisation had to do with?

It was certainly a stimulus to looking outside, but many of the dollars that came in as a result of the 30% obligation of course were government dollars from other government pockets and so counted in that was the Rural R&D Corporations income, the income from specific departments,

the Department of the Environment, Agriculture Department and so the piece of it that came stricto sensu from commercial organisations was maybe a-third of that, so perhaps 10% of the income of the organisation. Terry, have I got that roughly right?

Yes. And it kept decreasing.

Yes, thank you.

I think during your term as chief executive the percentage of the external earnings that came from private industry reached its maximum.

Well, we were certainly given strong incentives from the board to achieve that and government initiatives like the R&D syndicate initiatives and tax deductions for R&D, which were all innovations of those days, were all stimuli helping to push the organisation in that direction. There was a series of things that I did that I found very useful that I think haven't continued, and that was CEO forums with the major companies involving the best of the CSIRO scientists relevant to the interests of the company and the company's technical department. We did one with Telstra; we did one with the AMP Society; we did one with the Commonwealth Bank; we did one with Boral, BHP and so one by one a CEO level forum with the companies seemed to be a good way to uncover how CSIRO's technology could match with specifically identified needs of the companies. I thought at the time that that was a reasonably good initiative and it was one that did lead to a number of research collaborations.

Tom, I'd just like to ask John about R&D syndicates which you mentioned. Do you recall having any discussions with John Button about that?

Yes. I had discussions with John Button about R&D syndicates. By the time those discussions took place there was quite a concern in government that there were clever structuring lawyers who were perhaps subverting the system and that the system was in many cases being rorted and not meeting its original objectives. Having said that, I think if you look back at the syndicates there were a number of things that did derive from them which were of lasting value.

Earlier I believe that Button expressed the view to the leadership of CSIRO that there was no new money coming. If you wanted money you've got to get it through the R&D syndicate route.

Didn't express it in those words to me, but it was clear that that was, as I said before, one of the areas that we needed to look at very closely in order to tap this stream that had recently been open.

When you became the chief executive, Sirotech was there, the institutes had been formed and each of the institutes had a commercial manager whose task it was to help the divisions commercialise their research and bring the market to bear on research. The organisation had a legal department itself; Sirotech had a legal department and some divisions themselves had lawyers, so this plethora of legal device, did that cause any problems in the organisation and was bringing it all together partly to have a consistency of legal advice?

I think that was the idea of forming Sirotech in the first place, but it had the downside that I mentioned that it became a bit of a bottleneck in the whole process and the decentralisation eventually, I felt and the board felt, was a better model. It did need to be guided with commercial

practices which needed to be promulgated throughout the organisation and we spent a lot of time, effort and energy with the help of the legal department of the organisation and with Peter Bradfield who was brought in specifically to be the sort of coordinator of the commercial practices to produce a manual which was intended to guide the organisation through the quagmire that is often represented by that interface between government bodies and private industry and which had got us into several major legal issues in the immediate past.

Legal issues

Did you want to comment at all on those issues, how you helped resolve them?

There were two very big and troublesome pieces of litigation. One was the litigation with the Cassegrain company and the other with Charter Pacific. They were in different areas of science, which I won't go into. I think history records that very well, and the resolution of those conflicts was finally achieved through settlements and the CSIRO legal department, and particularly Terry Healy, helped us wonderfully through what was a particularly difficult area that was well outside my expertise. We also had a couple of board members who were experienced at major litigation. Particularly I'd mention Doug Shears and he was helpful in forming a board subcommittee to help steer these activities, but they were intrusive into the everyday running of the organisation and they were object lessons in how in some cases not to behave in a commercial environment and particularly they taught us that if we were going to put CSIRO scientists on to the boards of companies that spun out, we jolly well better give them the opportunity to educate themselves in the opportunities and pitfalls that that represents.

And I remember that I think at that time I was sent to a course for company directors. John, you say that when you came in you and the board thought it'd be a good idea to decentralise commercial activities. In a sense the legal problems made the organisation to some extent centralise things again - centralise some capabilities again, so in an organisation like CSIRO how do you make the balance between central functions and decentralised functions?

Well, with extraordinary difficulty, but I think the immediate interface that our clients wanted was with as close to the coalface as they get but the people at the coalface needed to be imbued with principles that were generated centrally and which governed a set of behaviours which was acceptable and less likely to result in dangerous activities.

The demise of Sirotech took a couple of years, so you had Colin Adam going there and then Don Gibson going there. In the Don Gibson files which I've read in relation to an obituary of Don Gibson, he thought that your aim was to bring Sirotech into the organisation, but in the end Sirotech disappeared altogether, so do you remember much about that process?

Yeah. It became a redundant structure, Tom. It became a structure that was unnecessarily multiplying entities and Malcolm Fraser demanded that we don't do that and I felt that the model that we ended up with was a better one and didn't require a corporate structure in Sirotech.

'Bringing the market to bear on research'

Early on in your time as the chief executive you were part of a government committee which was headed by Mr Block which was known as the Block report, so taskforce on commercialisation of

research and the title of the report is 'Bringing the market to bear on research'. In a way that was your - that's a very good title for a report that you had something to do with because in a sense that was your whole raison d'être of CSIRO. Can you talk - and this connects to our national research priorities exercise as well. How do we go about bringing the market to bear on research in Australia and do you think that we've made any progress in the 20 or so years since you left the organisation?

Yes. It's the central issue, I think, in assessing the need for and the performance of our national research agency. CSIRO is quintessentially an applied research organisation and one that was formed as a response to national needs. One of the most pressing national needs, I think, in the 21st century is the generation of new companies, corporate replacement in a firmament that's got a few big sad old corporations some of which are right now absolutely in the gun through the Royal Commission into the banking industry and there is still an inadequate new neogenesis of new companies on the ideas of Australians, so it remains today as bigger priority as it ever was. How can we achieve this? I think the initiatives that we took in those days and that the government took are still valid.

Australian policy tends to change rather too quickly and to be in too short a timeframe and the longer term backing of any of these innovation initiatives is unlikely to match the cycle of government in Australia and therefore long-term planning by industry departments, by CSIRO and by others is essential. Reaching out to small business was always recognised as one of the most important things we could do, reaching out to SMEs, and it's very difficult because on the one hand SMEs by nature of their structure are understaffed and don't have a lot of time to attend séances with guru organisations like CSIRO and tended to vote with their feet a bit. And secondly, they don't have a lot of money and believe that if CSIRO is going to reach out to them it needs to do so with contributions of money and that is of course difficult too.

So the structures around this are not obvious and intuitive. I think myself that venture capital needs to be even further loosened up, that government initiatives in tax incentives need to be persisted with and that long-term thinking within CSIRO needs to continue. It's an extremely difficult thing and your question was: have we made any progress? I think the answer's yes. I think if you look at the CSIRO in the post-war period it tended to be much more science for the sake of science. CSIRO today is communicating its successes in many areas, but particularly in commercial and quasi-commercial arenas and that just needs to be further reinforced.

John, getting back to the question of SMEs, it was during your term as the chief executive that the organisation had a special program for linking with SMEs which enabled divisions to do work for SMEs without expecting a three times salary return. That has disappeared now, but so you're saying - I think I'm getting the impression from you that some flexibility in the approach to small enterprises might be needed.

Absolutely needed, Tom, otherwise I don't think it'll happen because the likelihood of whole day events - and I can clearly remember this as an initiative of Bob Frater's. I can clearly remember a whole day event in Sydney where we invited 50 CEOs of SMEs to come and have a look at the CSIRO technology and look at the models whereby we could collaborate, and then we were asking through the day for feedback, and at about lunchtime one of the CEOs stood up, took the microphone and said, "You've asked us several times what we think of CSIRO. Sadly, I must say we don't very often think of CSIRO and incidentally whole day meetings are an anathema because we don't have time for them," and he left. That was a real eye opener to me that you have to tailor

the cloth to the product that you're trying to produce, so, Tom, I do think one has to be extremely flexible and it's likely that one size won't fit all and that one of the important reasons for decentralising effort in these areas to the divisions and to nowadays the flagships is that they're more likely to understand the particular needs of the client that they're dealing with.

One of the needs of small business is some analytical capability which CSIRO has a plethora of very good scientific instruments.

Correct.

But it's very difficult for small companies to afford the prices that the organisation pays, so that's one way where flexibility might be important.

Yes.

Cooperative Research Centres

We might come back to commercialisation towards the end of the interview, but I'd just like now to talk about the Cooperative Research Centres and your term as chief executive coincided really with the government introducing the Cooperative Research Centre Program that Ralph Slatyer had sold to the Hawke government in time for the 1990 election. The first round was in March 1991, a year or so into your term, so as chief executive were you consulted about the roles of CRCs? What was your attitude to them and how do you think that the - do you think they've been a useful addition to the national innovation system?

In the very early months of my tenure Ralph Slatyer payed me a courtesy visit, so this would've been about May or June 1990, and we sat down and he told me the concept. He said, "Frankly this is still a concept. It hasn't yet been formally agreed to but I think I have the prime minister on side. It can only work, it can only succeed if CSIRO is an enthusiastic supporter and I would envisage that CSIRO would be involved in every one of the CRCs in the early rounds." The concept was importantly a collaboration between CSIRO and universities and ideally colocation of effort in a geographical site often on a university campus.

Can I just interrupt you? My understanding of the initial concept was that it was supposed to be a cooperation between CSIRO, a university and a company or an end-user.

Another end-user, yes.

So it was a three-way.

Yes, but the research link importantly that Ralph saw was CSIRO-university but exactly, it had to have an end-user as the driver of the initiative. Now, I put this to the board and we discussed it and there was a diversity of views in the board, as there was in the organisation, about whether this would in some way compromise CSIRO's identity, would break up the organisation and would be a Trojan horse leading to demise. The other view, to which I subscribed, was that if we didn't do it, it would be far more dangerous because one would be seen to be more or less agreeing to the criticism of elitism and impermeability that was generally levelled against the organisation, both by the academic community and by end-user groups that it was just too damn difficult to

penetrate to the bits of CSIRO that were needed or were required and that without a structure like this, that criticism would seem to be to some extent sustained.

I think we went into those early discussions with our eyes open and with a view that there were dangers, definitely dangers to CSIRO and to its future and its continuity. Now all these years later, 25 years later or so, there have been several reviews of the CRCs and their consequence to the nation and to CSIRO and to the universities, and I was involved as chief scientist in one of those reviews with Don Mercer and I believe that generally the evaluation has been that the best of the CRCs have performed an excellent service and have fulfilled the promise that Slatyer gave them. Some have fallen by the wayside and some have failed completely, but my feeling would be that if you take the whole picture it's generally been a useful and good initiative and has probably protected CSIRO from the damaging critics who would've broken it up I think in any other scenario.

The CRCs by their nature encouraged multidisciplinary activities and to some extent CSIRO was able to in some CRCs contribute research efforts from a number of divisions that helped in a sense your aim to make CSIRO's multidisciplinarity an advantage to its end-users.

I agree.

Sorry, there was a lot of heat if not light generated around the subsidiary question around the formation of CRCs as to whether they should be incorporated or not, and part of the debate was that if they were incorporated then there was a company and the officers had duties to the company and not to the forming partners, so the relevant universities and CSIRO and so therefore the opposing view that they should in fact be collaborative relationships. Did that reach your level and were you interested in that question?

Yes, it did, and I was. Terry, I used to ask you these questions and rely quite heavily on that advice. I didn't see a compelling reason for incorporation and the only instances where it just seemed to be too difficult a sticking point and needed the axe through Gordian Knot or the sword through the Gordian Knot was where a company that was requiring incorporation to be a participant in a CRC which would otherwise not get up, but I didn't in general think that it was a necessary or good thing, particularly for the reason that you've just adduced, that who is my boss, who is my employer, what is the structure for which I'm working? Is it a tiny company or is it a larger nurturing organisation with career progression and with my personal prospects in mind like my CSIRO, so I felt in general poorly disposed towards the idea of generally incorporating CRCs.

The original proposal for CRCs was that they would have a finite life but that eventually that was overturned and some CRCs went on for more than one life. In your Mercer review what was your opinion of the longevity of the CRCs?

We thought having the finite period was a good thing, that in exceptional circumstances if a case was made that the CRC was achieving magnificent results and the prospect of even better results was best served by a continuation or a renewal, then that should happen.

Moving Head Office to Melbourne

John, at some time during your term you shifted the head office of the organisation to Melbourne. Why did you do that and in hindsight was it a good idea?

It was generally regarded as my initiative and in fact it never primarily was. It was the board in various strategic sessions asking the question of whether Canberra was the best place for an industry-facing organisation to be headquartered where there was so little industry in Canberra, and whether one of the more industrial Australian centres would be a more appropriate place for the chief executive to be seen to be and to be operating. It was pretty much a universal view of the directors of the organisation at that time that we ought to move. I was charged with making the case for it. I had help from the Canberra office and there were many people within that office who had a pretty strong interest in it not happening and in maintaining a Canberra presence for the very good reason that the principal shareholder was the Australia government and the principal funding and direct lines to the ministers to be preserved, but that view didn't prevail and we did move to Melbourne in a small office in Parkville very close to a CSIRO operating site.

Had we stayed in Canberra, it was my strong view that we shouldn't continue the separation in Limestone Avenue and we should move to an operating site, perhaps on Black Mountain, which in some sense was later done by Jeff Garrett, but I was quite keen to sell Limestone Avenue or to get the site redeveloped by the government and get some financial reward for it and to use that as a downsizing mechanism too for the support structure around the chief executive, which was part of the idea too of the move to a much smaller, leaner office, and those things we did achieve in Melbourne. You're asking in hindsight: was it the best move, should we have done it? It was a necessary experiment I think and the question becomes less relevant these days, much less relevant, where remote operation of businesses is enabled by technology to the point that it really doesn't matter physically where the chief executive is sitting in terms of the ability to reach out.

Melbourne or Sydney had the advantage that they were primary airports. My style as chief executive was to travel a lot and visit the divisions a lot. That was much harder to do from Canberra than it was subsequently from Melbourne, so I think you could say - and I would be the first to say there were pros and cons - but the experiment was done and it was useful. Some of my successes has chosen to be in Canberra and some like Megan Clark to have her centre of gravity more in Melbourne. I think it matters much less these days than it did then.

Very good. John, did you always intend to have only one term as chief executive?

No. No. I loved my job and was very much in two minds at the time when the end of my term approached. I was invited to a board retreat at Lancemore Hill at Lancefield in -

Outside of Melbourne.

- outside of Melbourne, and was very surprised to see when shown the agenda for that meeting by Ted Cain it was entitled 'John Stocker's next five years' and I just thought for the very first time, well, no-one has actually asked me whether I want another five years, and so we all convened on a Thursday evening at Lancemore Hill as a board and had a nice dinner together, and I said to the then chairman Adrienne Clarke, "Do you think we need to have a discussion before the general discussion?" and she said, "Why?" and I said, "Well, because we really haven't talked about a further five-year term or a further term at all," and she was rather blown away by that because it frankly hadn't occurred to her to have the discussion.

And because it wasn't imminent, the end of my term, I hadn't thought too deeply about it, so that night I got into my tracksuit and went for a long run and then called Jo on the mobile phone and

said, “Look, we’ve really got to think about this. I’ve got to think about it. I actually think I might be ready for a change,” and so I told the board the next day that I’d made up my mind and that I wouldn’t have another term, but it was a bombshell and I regretted it having to be a bombshell. I had never intended it to be, but it was a kind of mixture of the feeling that I’d given it a lot of effort and personal energy and that a further time in a government environment was less likely to be attractive to me than a time in industry, which I subsequently had.

And the inquiries that had constantly been imposed on CSIRO with senate inquiries and senate commissions and audit inquiries and a whole host of very intrusive things were starting to, I felt, be stultifying to the ability to really exercise management skills, and all those things coming together led me to a conclusion which I didn’t regret, but it was not my intention to just have one five-year term.

You joined the organisation when Neville Wran was the chairman. During your term as chief executive Neville Wran’s term as chairman ended and Adrienne Clarke became the chair of the organisation. The change of the board and the chairman, did that have any influence on your decision?

Hard to dissect out the different contributors to the decision, Tom. I will say of Neville Wran that he was a brilliant chairman and he knew the difference between being a chairman and a chief executive and was able to be highly supportive and critical when necessary of the chief executive but knew about the distance in the span of management control and had the additional advantage of coming from a completely different discipline area. I actually had noticed in my professional life that the relationship often works best when the chairman and chief executive come from very different backgrounds and from a diverse series of life experiences which they can then respect each other’s. That worked very well and when things looked sticky or difficult for CSIRO in the political sense, Neville Wran quietly went away and fixed it. He had the ability and goodwill to do that. He was a deeply humorous man and we had a very nice mutual respect going.

Adrienne had her strengths too, intellectually very strong, similar sort of science background to mine, hadn’t had the experience of the difference between being a chairman and actually running an organisation - she’d been the professor and head of department - and there were a few rubbing points as a consequence of that. I won’t say that they were in any way detrimental to the organisation or its progress, but it was different and when I was ready to go I was ready to go.

Very good. John, you went from CSIRO to Visy.

Yes.

Time at Visy

What was your task there?

Well, that was a really odd, very small 18-month phase in my career when Richard Pratt, the founder and owner of Visy Industries, invited me to be his head of research and innovation, my title was called, and my job was to set up a research department in a company making and recycling paper to make cardboard boxes. It was a whirlwind experience, a family company, and one was expected to be totally immersed and embraced by and within the family, and after 18

months I didn't feel that I'd made a very major contribution. Dick Pratt kindly didn't share that view and wanted me to stay on, but I really honestly felt that it was so far from my experience as a scientist or as a manager that the likelihood of me making a lasting and useful contribution was low, and so I left. He kept me on as a consultant after that for a while.

Can you just reflect for us, John, on the link between a company like Visy and CSIRO? By way of background I can remember that you made a lot of efforts to link the research effort of Visy with the areas of the organisation that you thought were going to be relevant, and we had various meetings and so on. In a practical way or advice to future interactors between research and business, what did that period at Visy - what insights can you give to the organisation from your period at Visy about how we, as the Block reports, bring the market to bear on research?

It was an attempt to do that on very many fronts. There were some practical issues. For example, the fact that waxed boxes, waxed for waterproofing and widely used in the marketing and fresh fruit industry, couldn't be recycled because the coating of polymer on the surface of the fibres was such that they weren't able to be properly wetted, processed and put through the paper mill, and so the CSIRO Division of Chemicals and Polymers bent its intellectual brain to that and was helpful in helping us look at some processes to help. There were a number of programs like that. Another one was in putting RF tags on boxes so you could follow the history -

I remember that one, yeah.

- of bananas, for example, picked in Queensland and you could see what atmospheric conditions they'd been subjected to during transport and what concentration surrounded them, so there were a number of worthy problems. What advice could I give? I think as always there is a bit of a tendency among scientists to follow their curiosity rather than the immediate cost and time imperative that drives a company to come to a product, and so trying to - meeting regularly and making sure that one is marching to a program which is agreed by both sides is often very difficult in that relationship and is different for a scientist exploring curiosity and a company needing product.

John, after you left Visy, pretty soon after that you became the chief scientist of Australia in a part-time role, so what was your attraction of being the chief scientist and what do you think you achieved as the chief scientist?

Chief Scientist of Australia and Board positions

The appointment was odd in itself. Peter McGauran was the minister who called me and said would I consider the role and had I considered the role. I said I certainly hadn't dreamt that I'd be approached to or consider the role and I wasn't available to do a full-time job. The reason that I wasn't available was twofold. One was that I had a number of tasks. I was on the board of Telstra by then; I was on the board of Cambridge Antibody Technology in the UK and Nufarm, so I was quite involved in corporate life.

But the second reason that I said to Peter was that I thought it was probably a good idea for someone giving science advice to the government of the day to be a practising scientist and a practising scientist doesn't need to be someone doing wet chemistry in a lab coat, but has to be someone earning their bread through exercise with science, which is what I was doing, and that that would be more likely to guarantee the independence of view that would be useful to the

government in coming to decisions than a full-time bureaucrat, and I still actually hold to that position. He said, "Thank you, I'll think about it," and to my huge surprise came back a week later and said, "I agree," and so I couldn't very well at that stage back down, having a secured -

You may not remember this, John, but after you spoke to Peter McGauran you rang me up -

Did I?

- and said, "Should I be the chief scientist?" and I said, "Yes."

Well, thank you, Tom. It was good advice. Look, I enjoyed it. What achievements did I make? Well, I think they're modest, but I had a very good relationship with the prime minister of the day, with John Howard, and I believe that for a chief scientist to be effective that is the most important link and John Howard was generous enough with his time to give an audience before every one of the Prime Minister's Science and Engineering Council meetings to the extent that he helped choose the agenda items and contributed quite in a spirited way to the discussion of what the agenda items were and then immediately before the meeting gave me the opportunity to brief him on who would be the speakers and what we'd be doing.

John, did that include his change of heart about climate change?

We didn't specifically address climate change.

That was later.

Yes. No, we didn't address climate change at those meetings particularly. The topics that I particularly remember: the Australia Telescope National Facility and the Square Kilometre Array was an important topic; the biodiversity initiative of the OECD which we were trying to secure for Australia was another one; science education in schools was a major item that interested him hugely; and one by one we developed topics which were not just of interest or upwellings from the science community, but were of interest to the prime minister, and I think that was a terribly important linkage.

The report that I did during my just over three and a-half year term on priority - this was called Priority Matters - was really a rerun of the exercise that we'd done that I felt was so successful in CSIRO and argued strongly that the nation ought to be looking at its areas of strength and building on those rather than trying to smear itself across the then 32 or 33 universities with doing everything in every place and so that was a spirited call to try and get some adequate muscle behind growth areas and areas of strength. That's perhaps enough.

As well as being the chief scientist you were on the boards of various technology based companies. This interview's not particularly about your experiences there, but if you'd like to say something about your contribution those companies, and Nufarm was one that CSIRO's very familiar with, and Telstra of course.

Well, in every one of those companies at some stage I gravitated to becoming the chairman of the science advisory board of the company, so I've been the chairman of science advisory boards of six different companies and of the Victorian EPA, and I really strongly believe that that's a very good model for getting the board involved and interested in science and technology issues. Boards of

Australian companies have in some cases, and in many cases and particularly in the past, focused on finance and legal issues to the exclusion of a proper consideration of a technology and science and research future of the company, and my little personal campaign was to try and do something about that.

The best way to do it was to form a strong science advisory committee and be the rapporteur for that committee at board level and to have a voice at the board meeting, a voice for the technological future of the company. In Telstra it was welcomed and I very much enjoyed my 16 years as a director of Telstra and ended up in the bizarre position of being chairman of the audit committee of the board which was an unusual role, and Cambridge Antibody Technology was a splendid company with wonderful technology which is now manifest in a revolutionary treatment for rheumatoid arthritis which is useful worldwide, and I chaired its scientific advisory committee. If you ask me what of my board experiences mattered most it was the opportunity I perceived to link being a director with bringing science to the attention of the most senior management, grooming of the company.

Back to CSIRO as Chairman of the Board

On the 28th of June, 2007 you became the chairman of the board of CSIRO. Can you say how that came about? That was sort of out of the blue.

Yes, again it was out of the blue. Julie Bishop was the minister who offered me the position and I grabbed it with both hands because I still had an affinity for the organisation. I had stepped down from a few of my boards, so I had a bit of time, and I was curious to see what progress and change had happened in the organisation since I left. I was blown away by the nice reception that I got from around the organisation. Again I made the attempt to get out and be visible in divisions and to interact with staff, and I felt that again that went down reasonably well. Perhaps the most important question that I asked at one of those early board meetings was what had happened to the initiatives that we'd taken in the early nineties and particularly took an interest in the Wi-LANs thing and whether it had made the organisation rich, and following that question and the responses to it, the securing of and committing resources to massive legal fights in the US was perhaps the most dangerous thing that I've ever done in any of the committees and organisations that I've served, and had that not been a success I think we wouldn't be having this interview and my name would be mud because it was a huge risk.

There was criticism within the organisation of spending valuable research dollars on lawyers. Fortunately Terry and his team and Jack Steele and all the clever people who defended the cases in the courts of Texas did prevail and protected the board from vitriol from which the board wouldn't have survived or wouldn't have recovered. Do you agree with that summation, Terry?

I think it's very generous on your part but I agree it was a huge gamble, but the way that the board reacted in 2005 when I came along and told them we've been sued by a few firms, Intel, Dell, Microsoft, Hewlett Packard.

Minnows or -

Their reaction was, "We must be onto something really big or that wouldn't have happened," rather than running away in terror.

Well, it required continuing commitment and I'm sure Catherine Livingstone and the team had provided that. It needed some big decisions in the early days of the new board and we took them, and it was good.

John, it was the Howard government and Julie Bishop as the minister that appointed you in June of 2007. The government changed at the end of 2007 and pretty soon after that the new government appointed me to the board, so yours and my activities joined up for a short time.

It was the old team again.

That three-year period. Apart from the Wieland litigation what was your impression of the organisation after you'd been away for 12 years? Were you happy with it or what was your -

Well, look, always there are good things and bad things. One of the good things was that the initiatives that we'd built on through the very dawning of those priority exercises had manifested themselves and evolved into the flagship which seemed to me to be a very good evolutionary path and a path which at least potentially enabled different scientific disciplines to be melded together toward important common efforts. The thing that perhaps was still work in progress and perhaps which not still enough progress had been made was the move to regard the research as serving an end-user and identifying the end-user and identifying the opportunities and hazards at those interfaces.

It's a perpetual problem, but it was one perhaps in which less forward progress had been made than I'd have hoped. Negating that point though was the very strong Commercialisation Committee of the board led by Terry Cutler and Jack Steele was the secretary to that committee and the legal department of the organisation was very strong in helping guide that, and I felt that that was applying the commercial principles and practices across the organisation in a very good and healthy way, so there were signs of a continuing evolution, a continuing progress. I think perhaps the perception by the government that that needed to continue and be accelerated would've been behind the decision to appoint another chief executive from industry and from outside the organisation.

My impression was that the organisation had during the period of government affluence of the boom got a very much larger percentage of its external earnings from other government departments and the strong drive to interact with the private sector that had occurred in the early nineties a little bit.

Yeah, I agree.

And so that's a hard thing to get back, I think.

Yes. Well, I think the appointment of Larry Marshall was perhaps a shared perception of that view.

The future role of CSIRO

If you were starting from scratch building the Australia National Innovation System, would you have CSIRO and what role would CSIRO have, if you had it?

I think you would need an at large respected group that was likely to survive the very short termism that drives governments, and CSIRO is a nice buffer for its great people against the whims of fickle government change, so yes, I would have a structure like CSIRO. It would be structured in a way that would enable the best of its science to work across disciplinary boundaries, and we've already in this interview described a few attempts going back to the nineties and continuing to this day to do that. It would need to avoid the sort of destructive influences that have happened to other national research agencies like the DSIR in New Zealand which was rent asunder in the nineties I think to the continuing detriment of New Zealand and New Zealand science, and it would be outreaching and doing all it could to explain to the public why it was important because what the public thinks determines the votes, what the votes do is choose the parliamentarians and the parliamentarians have to be there to defend the organisation.

In 1990 when you became the chief executive CSIRO was about 25% of the government's expenditure on research and development. In 2018 CSIRO is about 5%, so does that change of relativity have an effect in your mind on the role that the organisation has?

No, it needn't, and I think the government expenditure - it's all the more reason, I think, to accept the incentive to be looking elsewhere for research dollars through collaborations with companies in the way that we've discussed at some length during this interview. I think that's definitely another source and one that through demonstrably delivering commercial needs to those companies CSIRO can build on further and further and I hope that that will be one of the driving principles that Larry Marshall and his team will be following.

John, in 1990 a number of large corporations and organisations, private organisations, in Australia had research laboratories, so Telstra a large research laboratory, BHP had a large research laboratory, ICI ANZ had a large research -

CRA.

- at Ascot Vale, CRA had one in various parts of the country. In 2018 none of those exist really, so how does - and one of the issues to do with the transfer of technology is that the organisation that is being transferred to has to have some absorptive capacity or some capacity to use it. What are your thoughts on how CSIRO might as an organisation develop that research culture within the corporate sector?

Geography fortunately is less important than it was then. Through technology and through internationalism, which is just an inevitable and inexorable change that we can't push back - it would be like Canute and the waves - we have to regard that as an opportunity, and there are great examples in CSIRO of collaboration with companies that don't have very strong local research laboratories like Boeing Corporation, like DuPont, which have stood the test of time. It's identifying opportunities like that through presenting ourselves as an international player, not just as an Australian national player.

[INTERVIEW INTERRUPTED/RESUMED at 02:17:00]

So John, we're resuming again after that brief break and you were just saying that you would continue as an organisation like CSIRO and its role would be to be further involved in bringing the market to bear on research and interacting with corporations, particularly international corporations. How would you go ahead? How would you proceed in making sure that CSIRO and

the best of other parts of Australian science interacted with these companies? CSIRO doesn't cover all disciplines, particularly in medical research. How would you see that in the future?

The CRC program still gives a big opportunity for major collaborative effort and needs to be nurtured I think for that reason. I believe that when you go to China and visit major companies and look at some of the contributions that CSIRO has made, particularly in airport scanning for example, is a very good example where Beijing University and CSIRO have collaborated magnificently to be able to detect various anolytes in suitcases or containers. That's an example of the way we've got to work, and emerging nations like China - well, China's probably more than emerging; it has emerged - and India still provide great opportunities and CSIRO's a brand that is known and respected in those countries by their national research agencies and the government provenance of CSIRO provides a good opportunity in countries which respect particularly government agencies. China would be a glowing example of that.

Well, thank you very much, John, for spending all of this time with us. Have you any other parting comments that you'd like to make?

No, Tom. I think the initiative that you're masterminding here is a really interesting and important one and I just wish you strength to your arm and continuing success in finding funding sources to support it.

Thank you very much, John.

[END OF TRANSCRIPT]