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Abstract

This is a record of an interview with Professor Donald Lamberton who is a graduate of Sydney and Oxford and throughout a long and productive career taught in New England, New South Wales, Pittsburgh, Stanford, Case Western, Queensland, Australian National University and numerous other places. He is the author or editor of more than twenty books, thirty reports, sixty book chapters, forty articles and in his eighties is still supervising ten PhD students. Shortly after this interview, on Australia Day 2006, Lamberton was honoured with the award of the Order of Australia (Officer in the General Division) by the Governor General 'For service to economics, as a leading academic and researcher in the field of information economics through the multidisciplinary study of the impact of technology, information and society on economic development'. This is his story of an interesting, influential and unorthodox career path.

This is the 14th of December 2005 and I have the privilege of conducting an interview with Don Lamberton. The interview is being held at the School of Economics, University of New South Wales (UNSW). Don, thank you very much for taking the time for this interview, I appreciate it very much. Let me borrow some of your own words that you have used in talking about other people but now turn it on you to see if we can find out about the career that you have had. What we are trying to do here is to talk about your 'career achievements, roads taken, ideas developed and communicated, research students supervised, interconnections discovered and created, policies influenced, problems solved and inspiration given'. We'll start off with a snapshot of your career in terms of your formative years, early educational experiences and appointments at various Australian and overseas universities.

First, you were born in Casino, NSW, on the 29th of July 1927. You came from Scottish ancestry and grew up on an isolated dairy farm and was home-schooled until the final year of primary school. You left high school at the tender age of fourteen to work in a bank. That's hardly the ideal preparation for a distinguished academic career. Can you tell me a little bit about your family circumstances, your upbringing and your pre-university years?

'Impoverished' might seem appropriate. A Bank of New South Wales circular dated 23 October, 1933 was retrieved a few months ago from our old home at Ettrick. Its tables show the high unemployment and cost/price pressures of the 'thirties'. Efforts to diversify by sending fruit or vegetables to city markets mostly led to nothing more than a bill for freight charges. Relief work on road maintenance was the nearest thing to unemployment benefits. But we were rich in care, affection, and vision. The traditional Scots faith in education was the key to the future. The idea of reading and learning was implanted very firmly by parents who had missed out and were very determined to make sure their children would not be so

deprived. So our parents were our teachers. I still have Pendlebury and Beard, *A Shilling Arithmetic*, on my shelves. Their efforts were helped by my grandfather, John Montgomery, who had migrated to Australia early in the 1870s. He had preserved his Gaelic and was an avid reader. He was reputed to have coached Billy Hughes in public speaking. He exercised a quiet but important influence.

My brother was two years older than I and one of our hobbies was butterfly collecting, perhaps triggered by a flickering evening slide show in the neighbouring town of Casino. We advanced to the stage of corresponding with the State Museum and with F P Dodd, the Butterfly Man of Kuranda in North Queensland, about items in our collection. Our efforts were based on certain property rights; the butterflies were John's, the less spectacular moths were mine, with day-flying moths a disputed area. We discovered that certain rare species were attracted by certain plants and so we grew those plants. The chemistry of some such attractants figures in some of the 80 odd papers in John's University of Sydney D Sc, and in his career work at the CSIRO in plant chemistry.

Intermediate high school attendance involved time-consuming bus travel. While facilities may have been poor, that should not have been an excuse for poverty of thought. Some teachers rose above this and fostered the visions already planted at home. Miss Hill helped foster my brother's fascination with chemistry and Rob Gollan (whom I think later became Professor of History at the Australian National University) made history interesting during a few short months before enlistment. But otherwise I remember it as regimentation firmly under the control of a dictatorial headmaster.

Economic conditions remained bad for farmers. World War II brought general disruption. My father lowered his age and enlisted immediately after Pearl Harbour. I left school and started work in the Bank of New South Wales in May 1942.

Did you support the family?

No, but I supported myself from then on, not well but enough to live on. Like economist George Shackle I was encouraged and helped by a kindly bank manager or two; R K MacDougall and then E C Blunden. One encouraged me to do accountancy institute exams and so kept study habits alive; the other alerted me to the possibility of a city appointment and so being able to enrol as an evening student at university. It was only towards the end of the war that my brother, who was a student and doing so well that he had transferred from the University of New England (UNE) to the University of Sydney, exercised influence and got me back into formal study. I sat the Leaving Certificate as a private study candidate and did well enough to secure a Commonwealth scholarship. So I arrived in Sydney, with a change of plans, the scholarship had made full-time study possible.

So you attended the University of Sydney, graduating with a first class honours degree in Economics in 1949. Can you comment on your experience at the University of Sydney? Were there any academics that particularly impressed you? What led you to taking up a specialisation in economics?

The economics specialisation followed from the bank employment but also from some fairly strong impressions that had built up about what I called unfairness. Many people did well, but most came off badly: unemployment, all the farms mortgaged heavily, medical treatment

deferred, and above all little hope of change. Those thoughts were part motivation for doing an economic degree. Only recently, I came across Robert Oppenheimer's coining of the word 'underdogger' and I understood what he was driving at.

Who were the main personalities?

Many names come to mind. I had early contact with Geelum Simpson-Lee whose brother had been studying science at UNE with John. And that led to my becoming Student Representative on the Council of the NSW Branch of the Economic Society. Later I was one of the founders of the Economics Undergraduates Society which sought to bring together day and evening students. I found time to participate in debating and became Faculty Sports Representative. In the second year, Kingsley Laffer was a major influence. We had moved into the small honours group more or less by self-selection. And that permitted contact with staff as individuals despite the large classes that had then developed. The influences were Kingsley Laffer in second year, Heinz Arndt in third year and Herman Black and John La Nauze in the final honours year. There were others. I think particularly of Kurt Singer - Keynes called him 'the mystical economist from Hamburg' – who was one of the refugee intellectuals who contributed a great deal to academic Australia. His was a lasting influence in that I have always tried to keep events in historical perspective. My degree program took in a year of mathematics and three years statistics, during which Stuart Rutherford helped me to appreciate some of the content of Weatherburn and Kendall. I suspect I included anthropology in part because I'd been told Noel Butlin had done so and that decision had lasting influence. I included a paper by Clifford Geertz in the much expanded 1996 version of the 1971 Penguin readings, *Economics of Information and Knowledge*. We chanced to meet at the Rockefeller Bellagio Center where I was able to persuade Geertz and A O Hirschman to give an impromptu evening seminar. I routinely commend Geertz's book, *After the Fact; Two Countries, Four Decades, One Anthropologist* to my PhD students.

Do you remember what you did in your honours year at the University of Sydney? The thesis?

Yes. There was an honours component each year. In second year I did a major assignment for Kingsley Laffer on the retail trader association. In third year, I worked on the Foreign Exchange Market with Heinz Arndt. In the fourth year, I concentrated on the history of economic thought rather more than might have been expected. I was becoming interested in innovation and technological change, eg Schumpeter plus Gourvitch's book.

After Sydney University, you went to work at the *Sydney Morning Herald* and then the Sydney Stock Exchange from 1949 to 1953, then you returned to academia as a lecturer at UNE where you stayed from 1953 to 1957. What role did these eight years play in your personal development? Who were the figures at UNE that influenced you and had some impact on your career development? Would you have characterised yourself, at that early stage, as being a fairly conventional, standard economist?

I must have been to have done all the work I did on share price index numbers. There is a bit of the occupational record that I have to add here. After the student years of living on a scholarship, I was looking for a job that paid rather more and the prospect of a tutorship

wasn't so attractive. I spent some time on job search. The one I settled on involved trying my hand as a journalist with the financial staff of the *Sydney Morning Herald*. With the help of the Appointments Office I'd been to several interviews; Rear-Admiral Bracegirdle for BHP and a representative of the Calico Textiles Producers Association in the UK. I did not like what they were offering. Roger Randerson, Financial Editor, *Sydney Morning Herald*, had given a talk the previous week at the University Union. He had rather provoked me, so I dropped in unexpectedly and we talked about a career in journalism. He wanted to see something I had written. My only journalistic effort was a short article in *The Australian Observer*, a magazine with which Heinz Arndt was closely associated. He was on leave and had asked me to fill in and write his page for him. So 'Light on Bank Policies in Depression' was my first publication, dated October 1947. I presented this to Roger, and given that he had been much involved with the anti-bank nationalisation campaign when he was with the Bank of New South Wales, his reaction was not all that surprising. He said there was a lot that he disagreed with but it was well-written.

I digress. Roger had been Hayek's student at the London School of Economics and Political Science (LSE). Many years later he alerted me to Hayek's presence in Australia and I invited him to give a seminar at the University of Queensland (UQ). I think I am right in saying Hayek's name did not figure in the list of visitors in a UQ School of Economics 'history'. To resume my story, I started as a B-grade journalist with the *Sydney Morning Herald*. I worked from 5 pm in the afternoon till 2 am. That was not going to last.

A junior executive job came up with the Stock Exchange in what was then called its Research and Statistical Bureau. It did not do much research but it did compile a dossier on each listed company and it produced the share price index numbers. The company history material was good. I was roped into other tasks with the old-fashioned Call Room recording system. I remember my panic one morning when I was asked to replace the chap who did the recording of prices. I did not really know what I was doing but somehow I survived it and later became responsible for the computation of the share price index numbers.

Searching for old records down in the basement at 115 Pitt Street, I came across some banking records. I knew that Syd Butlin was working on his monetary history, so I sent them up to him. In due course, he returned them and in typical Syd style, the cover note said 'Thanks. Are you an applicant for the lectureship at New England?' I thought about this over the weekend and with some hesitation called him and said 'I got your note. No, I am not an applicant but I'd like to be.' He said 'Well, put in an application'. That was how I became a lecturer in economics at New England which was then still a college of the University of Sydney. Shortly afterwards UNE gained autonomy and became the external body responsible for the fledgling Newcastle College – all of which I found a fascinating exercise in university politics. My decision to move to New England was influenced in another way because my brother had spent happy years there studying chemistry.

What was it like being at University of New England?

Well, it had small classes. A high proportion of the students were, like my brother, on Teachers College scholarships. They were to be school teachers and that shaped their programmes. There were a few students who subsequently did well. I'm aware of three of my students who became Vice Chancellors; one was Don Aiken at Armidale. In terms of the Faculty, Jim Belshaw was Head of Department and an incredibly nice person. Ross Duncan and Ernie Boehm were lecturers in economic history and economics respectively. Research

was a matter for the individual. I raised external funds for my share price indices work. Ken Blakey arrived fresh from his Doctor of Philosophy work at Oxford with Andrews and Brunner and his comments rekindled my childhood dream about Oxford. I served on the Executive of the Staff Association, gained a bit of experience of the University generally, and chanced to meet up with a zoologist, John Le Gay Brereton. I discovered from him that there was an Australian War Services Canteen Trust Fund postgraduate scholarship. He had qualified because his father had been in the army and I thought 'Well, I qualify too, so I'll try'. I was successful.

That brings us up to you going to Oxford to do a PhD. You were at Oxford from 1957 to 1960. You obtained a Nuffield College studentship there. Oxford had a focus on production, profit and capital. You were supervised primarily by Philip Andrews although later you had some connection with Roy Harrod in a supervisory capacity. You were acquainted with John Hicks, George Richardson, George Shackle, Edith Penrose and you rubbed shoulders with some later very highly distinguished economists like Jagdish Bhagwati. Your PhD thesis was accepted in 1962. You had earlier published a related piece in the *Quarterly Journal of Economics* in 1960 and your thesis was published in 1965, titled 'The Theory of Profit'. Can you tell us a little bit about your experiences in Oxford? Who did you interact with? Who were the influences?

Interaction with some of the important people was fairly fleeting. Edith Penrose was visiting in Nuffield quite briefly. We talked and she lent me the galley proof of *The Theory of the Growth of the Firm* overnight. Initially my major involvements were the Andrews/Brunner seminar in industrial economics and Hick's seminar in economic theory. I didn't attend George Richardson's class as I was having enough trouble keeping up with two seminars. Once I had the studentship in Nuffield, there were regular College seminars as well.

There were also – we don't seem to have any equivalent in Australia even now – the inter-University seminars. They rotated around Oxford, Cambridge and London, and Manchester they used to say, was allowed to attend. I recall an excellent session at Cambridge with Rostow, on the *Growth of Nations*, as the distinguished speaker and Joan Robinson as the commentator. I can visualise her now standing over there against the window with the gardens in view behind her. She'd been allocated fifteen minutes but spoke rather briefly; 'What about Portugal? What about Ireland?' I realised how devastating some of the English academics could be in a critique. Those London-Oxford-Cambridge meetings were a very useful addition and brought contacts, including Australians meeting Australians. For example, Duncan Ironmonger, a fellow Australian, was at Cambridge at the same time I was in Oxford. We did not know each other in Australia but we met at that seminar and kept the contact up. He had tackled a difficult thesis on new commodities. I later tried to recruit him to Queensland. But that's another story.

What about John Hicks, how did you find him?

Hicks was not a talkative person. He did tend to be a bit severe on people. A personal touch came through at times. At my very first encounter with him I had to sit and wait for him for some time to sign an admission form. He had been filling a ceremonial role and obviously did not think much of that sort of ritual and said so. I never really got into personal discussion

with him but Ursula (the wife of John Hicks) compensated for that. She was very helpful to students.

Let's then talk about people that did have an impact on you. I guess we will start with Philip Andrews? What about his approach?

Andrews was probably the more sustained influence because he did what I suspect a lot of supervisors did not do. He really read and critiqued what you wrote. He was a dedicated teacher. He did not object to disagreement. He was introducing his students to a version of what decision-makers did in real life situations. You could then argue about why they did this and why they did that, and you'd begin to generalise and shape theories and so you got full cost pricing and the Andrews-Brunner contributions. I found them both willing to listen and wanting to hear questions. Ken Blakey had told me about this and it was fully borne out. So out of my experience as a PhD student, they were the ones who were prepared to make the effort and really were helpful and encouraging. You do need encouragement in those years.

Do you think that your PhD was a typical Oxford PhD - in the sense that it was on profit, capital and production?

No, I don't suppose it was. But there were a number of times I had opinion that it was not shaping as a thesis. But one hears this so often that I can only say to students that if you're really convinced you've got something to say, push on. If you're doing a routine piece of empirical work, pay more attention to criticisms because you may be making technical mistakes. But if there is an idea deep down and you really feel it important, keep at it until someone can really show fault in it. And I guess that was happening with my approach to profit theory. I attempted to treat information and organisation as capital, and that was a sufficient departure to ensure that a lot of people were going to disagree.

But where did these ideas come from? Out of what reading, or out of what conversations?

Work experience may have had something to do with it. I suspect that during my brief time as a journalist, and at the Stock Exchange running an investment bureau, I began to be interested in the use made of the output of that Bureau, which was a forerunner of ASIC today. That had something to do with it, but I can't pin it down to one particular thing. It seemed to me a fairly obvious question to ask how and why people made their decisions. The optimization of the theory texts left little room for the Shackle questions; 'What do they know? What do they believe?' Such thinking appealed to me and I searched for a framework.

Had you read Machlup at that stage?

No. His very important book, *The Production and Distribution of Knowledge in the United States* came out in 1962 and that was followed by his organizing the 1965 American Economic Association Conference on Knowledge Production and Innovation. His *Economics of Sellers' Competition* (1952) and his article on verification had helped with my approach to empirical studies.

But you were working on parallel paths?

Yes, he conceptualised the task on an economy-wide basis and had the resources to tackle the empirical work. Even if I'd thought of doing it, I would not have commanded the resources necessary. No, I didn't get into his work until after I had finished my thesis. In retrospect, I did not appreciate Hayek enough, and this may have been partly because I tended to differ from him on the broader attitudes that he added to the analysis. When I look back on it now, I should have been prepared to embrace his basic ideas much more readily than I did. I've been reading Bruce Caldwell's *Hayek's Challenge* recently.

Any other further thoughts of the learning experience at Oxford...

It served very well by creating a network while I was there but it also carried over to my later career. I think, for example, of someone who was not an economist. Glenn Wilson went from Nuffield to be the first professor of political science in Rhodesia at the new university there. Subsequently I visited him when he was the foundation head of Stephenson College at Santa Cruz. I visited him later still when he came to Murdoch University as Vice-Chancellor. So Nuffield nurtured a fairly leisurely kind of contact that created friendships in a way that lots of other seminars and conferences don't seem to achieve.

I'd like you to introduce some of the students who were in that seminar.

The College seminar was rather formal. People like Harrod would come in and pass judgement on someone's thesis. The informal groupings of students were much more important. In my case, it included Max Neutze, a New Zealander, who spent long years at the ANU; Jagdish Bhagwati - I don't have to spell out who he is. Graham Pyatt who came over from Cambridge and was a distinguished professor later at various locations. John Corina was a rather unusual person who produced a few works in industrial relations but influenced many people. He was described by one of his mentors as a genius. He was a visitor at the University of Queensland in later years and accepted a chair at Sydney University. I was probably one of the very last people to speak to him (by phone) as he was dying in hospital. He was dedicated to what I think of as real scholarship. It was the experience with these fellow Nuffield students that has led me to invest a lot of time in the STEP programme. I will touch on this later.

Let's leave the UK. You've returned to Australia, you have a senior lecturer position at the University of New South Wales where you stayed from 1960 to 1969. You were promoted to Associate Professor there. What was the University of New South Wales like when you arrived, how do you characterise your decade at UNSW?

The large numbers of students dominated the scene and staff were burdened with very heavy teaching loads. It was a mixed faculty. Accountants and lawyers probably outnumbered economists. There were statisticians rather than econometricians. There were interesting things outside economics but there was not all that much interaction going on and that was disappointing to me. It was pretty straightforward teaching. Some good students were

starting to reach the Honours Programme. I suppose my ideas were focusing on industrial economics teaching and my information theme.

Is that because Alex Hunter was there?

Alex came during that period and we shared that ground. I suppose I would have been happier with a department that emphasised Alex's interests rather than pure theory. I recall one particular difference that came up, and it was not really a clash, but the Head of Department as all Heads of Departments do, had to make decisions.

You are referring here to Murray Kemp?

Yes. The particular case was that I saw merit in a possibility for a student to do a PhD in economics. Through my brother's links I knew some of the Chemistry Department people at the University of Sydney. They had a remarkably good student, Stephen Hill, graduating with First Class Honours in Chemistry and interested in industry. It seemed a possible way of marrying the two strands. I've done much work since proceeding in just that way. But the interpretation of the rule was that this student could do a PhD only if he did three years of economics first.

The profession has changed a great deal. If you had a mathematics background now, they'd welcome you with open arms into the profession even though you might not know any economics.

Math would tend to be the exception still. Anyway, Stephen diverted to Melbourne where there was a new management school and he did his doctorate there, bringing together his knowledge of science with management and he has had a very successful career.

I have irritated some management colleagues by going back to remarks by Solow long ago about management teaching in the US. His contention was that we need more scientists and fewer managers; that the need is for people who have learned something about the technology of a particular industry and something about management. Admittedly, there can be a problem at the PhD level in that it raises joint work issues. I have never published jointly with my PhD students. I've made this a rule because I've seen it harm the interests of students. I suspect commercialization pressures worsen this situation.

That's very different from the American system because one of the main benefits of having PhD students is it helps you with your own research output.

I understand that is a widely held view. A referee slashed my \$ request on a recent grant application on the ground that 'I'd have a cohort of students to work for me!' I've seen it work against the student's interest far too often. I asked one colleague why he co-published with his students. He said 'It's my ideas he used'. It is my view that specific indebtedness to the supervisor's work should be acknowledged like any other contributions. I know practice has changed but I can still warn generations of STEP students to be alert. Commercialization trends and performance measures are adding to these pressures and are additional reasons for concern.

But to return to the point I was making about management. Look at the real world health system and recent pleas to 'remedicalize' the hospital system. This is very largely because of what I call management by rule, targets, performance measures and all the rest of it. Actually, 'medicine' does not seem to fit in. But this also extends more widely. We may have gone so far down this road that we end in Arrovian organizational obsolescence.

You had some relief from the heavy teaching burden at UNSW. You obtained a Fulbright Travelling Scholarship for the 1966 academic year and spent time at the University of Pittsburg and Stanford University, sharing a basement with Paul David, Ron McKinnon and G.S. Maddala. Can you tell us a little bit about that trip?

It was an enjoyable trip. The teaching stint at Pittsburg initiated my working relationship with Bela Gold. I liked Stanford. Jim Rosse made me welcome. He had a background in the media industry before he took an academic post and he was thoroughly enjoying Stanford. I've sent quite a few students to Stanford since and I've pointed out to them the richness of resources there. In many ways it seemed the best of the American universities. I've since experienced Michigan, Yale, Harvard, Syracuse, Colorado, UCLA and Pittsburg, plus a few years at Case Western with frequent visits to Columbia, but Stanford has remained, for me, the best of the American system.

When you were at Stanford, was there a community of information economics scholars?

Stanford was becoming the leading research university of Silicon Valley as Margaret Pugh O'Mara records in her excellent book, *Cities of Knowledge* (2005). Nevertheless, the answer is 'no'. The information revolution was happening in technical fields but it hadn't spilt over. Fritz Machlup organized the 1965 annual session of the American Economic Association with the theme, 'Knowledge Production and Innovation'. I suspect the only Stanford paper was in business finance analysis during a joint session with the American Finance Association.

The real information economics push tends to be associated with Arrow's name. He left Stanford to go to the east the very day that I arrived there in my first visit... and the second time I was at Stanford some years later, I had to vacate my room because he was coming back. So I didn't have direct personal contact with him but to my mind his was the major influence....the classic papers that were always cited. There have been many contributors. Machlup's work did not have immediate impact. It was slow in building up. I suppose policy developments and the diffusing technological changes were influences that gave it importance somewhat after the event. But it was a very lively atmosphere at that early stage in Stanford.

There were indirect effects on my career. I had explored the alternative possibility of the University of Michigan because of Everett Rogers' diffusion work. He had encouraged me to come to Michigan on study leave but was realistic about the climatic differences. He drew comparisons and I remember the last words of his message were 'and the sun sometimes shines in California'. There were several consequences of our communication. He was to contribute a paper on Communication in Development to my 1974 issue of *The Annals on The Information Revolution*. And our communication was to make the thought of moving to Case Western Reserve University more interesting.

You also mentioned Paul David's influence.

I became aware of his work and I've continued to follow his publications. His latest thinking about the problems to be encountered in the international pooling of information resources and his emphasis on social rather than technological barriers fits well with my own interest in a widened analysis of the process of information sharing. In my thinking about information sharing, I seek to introduce knowledge structure and to make use of complementarities in analysing the sharing process.

In 1969, you were offered a professorial position at Case Western Reserve University where you stayed from 1969 to 1972. And while you were there you published two very well known collections, one on *Industrial Economics* (1971), that's well known to Australian economists, but the other one, the *Economics of Information and Knowledge* (1971) is well known internationally. It is regarded as a pioneering contribution to what Joseph Stiglitz would later call the 'information revolution' in economics. In what ways did your stay at Case Western really get your career going or open your eyes to further opportunities and lead you in a certain research direction. What led to the publication of that highly acclaimed volume?

The *Industrial Economics* book was very much a carry over from University of New South Wales activities. Let me give a bit of background on my move to Case. Bela Gold had linked up with Philip Andrews at Nuffield and that may well have been instrumental. Why did it pay off to the extent it did? One factor was a chance event. Melvin Kranzberg, who was well-known as the founding editor of *Technology and Culture*, was based there and I chanced to meet him when I'd been there just a few months. We talked and after the first few contacts he said; 'Look, Columbia University has a monthly seminar and you must come to that. I'll tell them to pay your fare and put you up at a cheap hotel'. So I had a couple of years visiting the Science and Technology Seminar which drew people from all over eastern USA. The seminar really impressed me. When I sat at a coffee table at Minneapolis airport lounge a few years later being interviewed by Vice-Chancellor Zelman Cowen for the chair in economics at University of Queensland, I found myself saying; 'The Columbia Seminar has got to be reproduced in Australia; it is a bit costly but it has to be done.' It still hasn't been created and I'm still talking with people about the need.

What so impressed you about this gathering?

It was all off record. There were people in very senior government positions, top people of the science world, people who really did research rather than administrators who controlled research funds, people at the frontier in research and across economics and the policy process and in a great variety of scientific fields, and people in industry who were concerned with the use of those technologies. We still don't see this coming together as an intellectual enterprise on the Australian scene. Individuals like Kranzberg could develop such an approach in the US. He had by then an established record with *Technology and Culture*. The bridge building was something that he was already doing but the other participants embraced the notion. I can look back on remarkably frank comments by very prominent people about what was going on and why. This was the sort of discussion that did not get into the press, did not get into the

journals, but it reflected awareness of the latest developments. It established in my mind the need for something which was and still is sadly missing in Australia. Through it I had my initial contacts with the Office of Technology Assessment in the US system. We don't have anything akin to that in our industrial economics scene. We have had a few small efforts but the Columbia Seminar was different. Historians of science could be brought in to provide the historical perspective to important developments. People on the defence side might be willing to explore ideas in such a setting. I think it is a great idea and is still needed. However, I am not at all sure whether Canberra could appreciate how valuable a resource it could be.

Were there any academic economists that played a role here?

Yes, but they were people who had already stepped outside the boundaries of their academic discipline. For example, I was teaching industrial economics at Case. This meant that I was getting good students who were in graduate schools of engineering before they turned to economics. It was part of what I believed to be a worthwhile approach in terms of interdisciplinary work. It's like the Solow comment about manager needing to know something about technology.

I had already experienced this with Andrews for example. Philip and Elizabeth used to organise the industrial economics seminar in Oxford on that basis. To give an illustration, when Bain's *Barriers to Competition* came out, we spent some weeks on that book. Then we had people come in from industry. These were not run-of-the-mill people managing factories; they were people who were making policy decisions in big business. So we were hearing their interpretation of events. Then we'd try to match their ideas with Bain's analysis. At the end of the semester, we would go to the industry location for a few days. The visit would end with a joint meeting, sometimes with the Board but with a panel of really senior people in that firm. They were receptive to ideas – and sometimes responded with job offers. We should be trying to show industry what we have to offer if we want to get the real social benefit out of the education process. But this was part too of the Columbia Seminar experience, part of the programme in which I had participated at Case, and sought to replicate elsewhere. But when I sat at the coffee table talking to Zelman Cowen about the Queensland appointment, I was trying to say that a mix of these elements was an innovation we ought to be transplanting. He seemed to buy it but later on support wasn't forthcoming.

Before we arrive in Queensland, tell us a little bit more about that book, *The Economics of Information and Knowledge*. In hindsight - clearly it was ahead of its time – it is expressing ideas that would later really take off.

There may not seem much of me in it except that I wrote an introduction but it was an overview with road signs. I would like to think the achievement was, first, that I was aware of these contributions across the range that it covers; second, that I was able to persuade these people to have their work included; and third, that it marked an important point in the process Jack Hirshleifer was to later label the expanding domain of economics. I should position it in my personal timeline. As a book proposal it took shape while I was in a sense homeless; I had resigned from UNSW and was getting ready to depart to Case Western Reserve. I am most grateful to John McCormick, who was the editor of the Penguin series. Actually, the proposal I put forward was for the *Economics of Technological Change* and the reply I got was that Rosenberg had just about finished a volume with that title. I thought: Well, that's a pity!. But

would that volume deal with what I was trying to do? Perhaps I did not have the right title? While I was chewing that over, McCormick came back and said just that; the perspective was quite different from Rosenberg's. So I was encouraged to bring it out with the emphasis I had wanted, *Economics of Information and Knowledge* Thirty three years later there is still a trickle of royalties from foreign language translations.

Let's return you to Australia now. As you indicated you were given a chair in economics at the University of Queensland where you stayed from 1973 to 1989. Two particularly significant things happened while you were at the University of Queensland. First of all, there was this Special Issue on 'The Information Revolution' in *The Annals of the American Academy of Political and Social Sciences* that came out in 1974, which is a very prestigious publication, and secondly, there was a launching of *Prometheus* in 1983. Do you want to talk about those two episodes?

Yes. I suppose that means I have to say something about what I found at the University of Queensland. Ron Gates, Public Finance, was Dean, Ted Kolsen, Road Transport, was Head of School. Together, those were the established activities. I was already committed to the information and knowledge approach. I started pushing in that direction and I suppose as the new professor in the place I was tolerated and given some scope. So I brought in changes with industrial economics and I started talking about information. My Inaugural Address was *Who Owns the Unexpected? A Perspective on the Nation's Information Industry*. It was not well attended because the University administration let it clash with Federal Budget night.

UQ was a conventional economics department where most of the research students - there weren't large numbers - were doing theses on public finance and transport. It was old-fashioned in a variety of ways. A lot of the courses needed updating. It wasn't well-resourced, but it was a fairly large department, and we did get around to changing and increasing the options available. I was able to recruit Stuart Macdonald from the UK. Macdonald, a historian interested in technological change, fitted in very well. We still collaborate on work on the role of information and in the editing of *Prometheus*. He has a management emphasis, although he can be quite scathing about management programmes. We were joined by Tom Mandeville, a Canadian interested in regional economics. It was becoming a team effort and students were starting to take an interest.

Graduate student numbers were rising but I faced a problem. 'Do I send them to Stanford or do I keep them here?' I tended to opt for overseas study as a long-term building strategy. One of the very best to my mind was John Beggs who impressed me profoundly. I remember saying to him; 'Look, you are starting a PhD, I'm your supervisor but I don't want to see you finish your thesis here. I want you go to one of the best universities overseas'. He confessed to dislike of the GRE process so I said; 'OK, you are going overseas. Not all good universities require tests; some go on recommendations'. So he went off to North Western where he performed brilliantly and was teaching at Yale before he submitted his thesis. I was a visitor there and met up with him. Here was this modest fellow from Brisbane on excellent terms with senior colleagues like Tobin. For me, it is one of the sad stories of the academic scene that he came back to ANU but left to move to a firm of actuaries and then the Commonwealth Bank. He was absolutely first rate but he did not seem to find a home at ANU.

But to get back to the Queensland scene, there were some good students coming through. I started detecting some of these and used my connections at Stanford and other universities.

I noticed that in your *Festschrift* there was an article in there by Joshua Gans.

He was one of the Stanford group. I remember having dinner with Joshua and his parents after he got his scholarship. John Hillas was another, he is at University of Auckland now. His GRE result was so good that he became a standard of reference. If I made a recommendation to Stanford, they would ask how the new person compared with Hillas, I haven't seen him for many years. I'd like to catch up with him some time.

You still haven't got to my key question about the *Annals*.

The Information Revolution issue of *The Annals* was intended to try and enlist the interest of the wider academic community and policy community. It had a good list of contributors; Shackle wrote the opening piece. It had a good reception but there weren't many people in Australia who were interested; it simply didn't mesh with either their research interests or their policy inclinations. One exception was Fred Emery. Fred was a Tavistock Institute psychologist who seemed

to remain pretty much on the fringes at ANU. I last met him at Sydney Airport on his way to Indonesia. He preserved the hope that we could create an integrated social science research centre. For me it would have been a well-supported Information Research Unit such as we tried to create at the University of Queensland.

The Annals had spin off and for me personally facilitated some of the international involvement with the OECD and other organizations that followed. The OECD was building on the Machlup statistical work. I tried to get the ABS to take that up but they weren't interested. In the event I was invited to the OECD to participate in their work and they asked member countries to participate.

The idea of *Prometheus* began as a joint enterprise with Stuart Macdonald. Then one day, I was asked by Griffith University to sit on the selection committee for a head of their Science Studies programme. The person being interviewed was Ann Moyal, historian, and that was the beginning of a long association. *Prometheus* took shape from the discussions among Macdonald, Moyal, Mandeville and Lamberton. It seemed to fit well with other activities; teaching, supervision, and writing. The University of Queensland Press was well-known for its book publishing but they turned us down because their existing journals were a financial drain. We recruited an impressive Australian Editorial Board and secured some generous financial support from the business community with help from the University of Queensland Department of Economics. Under a contract where we guaranteed to pay their costs, University of Queensland Press produced the early issues. And that means that it is still catalogued in, e.g., the National Library, as University of Queensland Press, where it was first published! So *Prometheus* was launched. It was a household project. It moved with me to CIRCIT. It moved again to Canberra and after I was at ANU, we received an offer from UK publisher, Carfax, saying that they would like to put it into their stable. We agreed and I haven't had to give much attention to the business side of its operation which is now in the hands of Routledge Taylor and Francis.

You had sixteen years at the University of Queensland. It's quite a long period of time. When you look back at it, can you still see some landmarks of your contributions there while you were Professor and part-time Head of Department? Do you see your imprint on the place that we see today? It's one of the few places where we still see diversity.

Imprint might be too strong but I think there was a sequence set in motion. In our book, *The Trouble with Technology*, Ken Boulding wrote about technology and the evolutionary process. The evolutionary economics people have understandably emphasised the newness of their theme but there is continuity. Thinking about the role of knowledge, about learning and unlearning, can hardly neglect the evolutionary nature of those processes. It seems to me now from the contacts I have there, e.g. Tom Mandeville and Jason Potts, they are very much concerned with the role of knowledge. Perhaps our information economy ideas helped their later efforts. Tom Mandeville is still supervising people in the information and communication area, and my own supervision and thesis examination extends to a number of universities. Perhaps our efforts created a base. It was not quite like trying to build information economics on transport economics and old style public finance. The *Prometheus* interest in science and society, technological change of the communications and IT kind, and knowledge economy ideas should have been a friendly base to build on.

You left the University of Queensland and in 1989 you joined the Centre for International Research on Communications and Information Technologies (CIRCIT) in Melbourne and you stayed there until 1992. It was not the happiest of experiences. Perhaps the potential, the promise that everyone saw in it, was not quite achieved.

CIRCIT was established to do fundamental research and it was supposed to play a coordinating role on the research scene. It did neither, becoming lost in the complexity of day-to-day events, providing commentaries rather than seeking understanding of the underlying changes occurring in the information economy.

It has been suggested that it did not receive the funding it should have received. An alternative view would ask whether such high cost premises on the south bank of the Yarra were necessary to command the respect of the business and governmental communities. The real need was for a long term research strategy and for coordinated efforts. On the networking front, little or no funding was channelled to universities. Some of the research students produced good theses.

You left there and were then associated for quite a period of time with ANU from 1992 to 2004 in their Urban Research Programme and later the Public Policy Programme. Can you tell me a little bit about how you found the ANU and what you did there?

To take the positive, it was a nice place to be in terms of people and facilities. I continued a high level of supervision of PhD students, not all at ANU, and some very good theses have come out of those associations. It brought back the link with Max Neutze from way back in Nuffield days. We did collaborate and wrote a joint report for ABS on measuring the knowledge economy. It was not very long before Max's death. I have absolute highest regard for Pat Troy who was the Director, in that he could bring the economics, social analysis and politics together on policy matters of city development in a way that few others manage to do. It was an excellent partnership between him and Max Neutze.

As for the interest in information economics, the paradigm in economics may be changing but this is not all that apparent in Australia. I will give you an illustration. When the Akerlof/Spence/Stiglitz trio got their Nobel Economics Prize for information economics, the one who provided the longest list of references was Joe Stiglitz. I looked through these and then focussed on the 111 single authored – Joe Stiglitz alone – articles. I do not have great faith in citation analysis but I thought I might use it to test the Australian response to Stiglitz's work. So I took the decade before the award and searched for citations of those 111 items in *The Economic Record*. I found that five of the Stiglitz items out of the 111 had been mentioned. One of these items was included in the references but not in the text. But I looked carefully at the other four and I would contend that the reasons why he was given the Nobel Economics Prize did not really figure in the thinking of the persons who cited those papers. The papers were on finance, or development or whatever, but they were specific references and did not, in my judgement, reflect any broad appreciation of the information economics that Stiglitz was working to create. So it was a small test, not a totally persuasive one, but I think it tended to confirm my impression that *Economic Record* authors were neither well-acquainted with nor interested in information economics. Despite the obvious scope for consideration of information issues, such interest as I met at ANU tended to be outside core economics, e.g., in law, history, and development studies.

There was some interest in technological change but the trouble is that many authors take the approach of looking at aggregate measures of productivity. I send my students to the little essay by Anne Carter in the OECD, *Measuring the Knowledge-based Economy* in the late 1990s. She was pointing out that there are very serious measurement problems; either major components are not measured at all, or if they are measured, there is no good reason for thinking that the measures mean much. So I don't think that approach has given good answers. One has to go further to the *use* of information and knowledge in order to answer the important questions. Jason Potts' emphasis on connectivity seems a step forward but there is still need to clarify the relationships involved and the information and knowledge flows and their use.

More and more, I deplore the sort of policies in favour. They are all about creating access to information and promoting the sale of computers so people can access the internet. Even the Internet Institute at Oxford studies what they call 'take-up' which means that there is a computer in the household and someone might be using it. Economists have long been criticised for assuming rational behaviour. This access emphasis is akin to that, because they are saying 'This information should be valuable to people and so we provide the access and they will use the information'. But if you look at empirical work that is being done, there are major barriers to information use. One of my students, Youn-Min Park, did a thesis asking the question 'Why don't elderly people use the Internet?' She talked with elderly Koreans in their welfare centres. Such inquiry doesn't persuade the econometricians – many of whom ought to take Peter Swann's new book, *Putting Econometrics in its Place*, seriously - but it draws attention to important circumstances. Park's elderly people, many of whom had been displaced from rural landholdings during the Korean war or through economic crises, did not share common interests with the rest of the society. So it leaves us with an interesting question. If I think of information as capital and as having structure, the possibility of incompatibilities, mismatches and so on looms rather large. I think back to a superb discussion by Clifford Geertz and his concept of local knowledge.

In your time at the ANU, even if the interaction with the pure economists was not that productive, you did find plenty of soul mates?

Yes. I had a number of successful students and I kept the two journals alive. I continued to be involved in some of international activities like the International Telecommunications Society. I suppose I had a fairly quiet life - a second retirement.

It seems a pretty active retirement. In 2005 you went to the Queensland University of Technology where you are an Adjunct Professor in the Creative Industries Faculty and in 2006 there was an ARC Centre of Excellence for Creative Industries and Innovation awarded there. What are you doing now at QUT?

I am supervising PhD students mostly in other universities, editing the two journals, researching and writing. I was listed as one of the investigators for the Centre of Excellence. QUT has promoted an approach that has surfaced in other countries, notably the UK, focussed on 'the creative industries'. Richard Caves is credited with the initial book; Florida added his ideas and others followed – although there seems less inclination to follow Florida's later book which emphasised the mobility of creative workers. The movement has spread to New Zealand and has linked with cluster growth approaches and regional development policy. It tends to emphasise small scale and it talks a lot about creativity. The problem that I see is that not everyone has the same bunch of industries in mind when they say 'these are the creative industries'. They are mostly using a rough definition akin to the old notion of cultural industries.

But when you try to focus on creative industries, it is well to remember Schumpeter's creative destruction is the other side of the coin. Creativity is an elusive notion. We need to be careful in assigning credit. I much prefer the idea of creative *industry* and I seek recognition for the creative achievements of both scientists and ordinary workers – all decision makers - throughout the economy. Anne Carter pointed out that R and D was 'only a small fraction of knowledge-related effort in today's industry.' Our writers illustrate this wider interaction; Margaret Atwood has made good use of 'Big Pharma' and we might reflect on Charlie Chaplin's role in the film *Modern Times*. Chaplin qualifies as a creative worker in the economy but he got his raw material from the real world of factories. He gave us what has been called by George Basalla 'the single best film ever made for a mass audience treating technology within a social context'.

There is a paper in *Prometheus* (March 2006) by one of our Australian colleagues, Paul Robertson, jointly with several people in Europe. It reports a major project undertaken through a consortium of eleven European universities. They have been looking at the creativity contribution but across the whole industrial structure. They focussed on the low and medium technology strata of industry and their conclusion is that those industries are highly successful innovators and therefore by definition creative. They do not do anything that would be classified under the OECD as R and D, and they don't qualify for R and D support. I've repeatedly said this is not a new problem. Look back and you'll find Australian economist E. R. Walker in 1942 saying that much that the businessman does if he is on the job is experimental. Once someone contemplates on experimental activity, as Shackle noted, there is not one answer but a host of different possibilities. The decision-makers have to imagine different possibilities - that is the creative activity. If this is what businessmen and their workers do, the pool of creativity is a very large one, and you cannot narrow it down and say only particular industries are creative.

Also, in the input-output analysis of Leontiev, the emphasis is on the interdependence and intermeshing of the whole economic system. As soon as you adopt a knowledge system approach, that is underlined. It is even stronger if you emphasize the meshing of knowledge and creativity. For example, look at the media as part of the 'creative industries' who works in the media industry? How creative is their daily work? Machlup studied the knowledge economy and distinguished a variety of different knowledge activities. Knowledge creation was the very smallest category in his statistical analysis. There were knowledge transporters, transformers, processors, managers, interpreters, analysers, and installers but the actual numbers involved in knowledge *creation* was a very small fraction of the total. There would have been some understatement because there is always a wider participation in the knowledge process. So the upshot really is that one should value creativity without regard to the occupation or industry.

This may seem a digression but I'd like to comment on the 'one right answer' view of science. Perhaps the simplest way of making my point is to quote from Bird and Sherman's book, *American Prometheus; The Triumph and Tragedy of Robert Oppenheimer*. They report that Einstein was charmed by Niels Bohr's 'manner of uttering his opinions like one perpetually groping and never like one who [believed himself to be] in the possession of definite truth.' Henry Pollard's *Uncertain Science... Uncertain World* should be required reading. We should be more fearful of 'the one right answer' syndrome in management, policy formation, and political processes.

So I hope that the QUT research program might find a way to foster this wider view. I am currently working on information sharing and focussing on complementarities in knowledge structure. I believe there are implications for Arrow's pioneering work on the value of and demand for information. There seem to be ways in which this research will link with Hayek's contributions and perhaps some of the knowledge ideas of Menger.

A quick scan of your publications reveals more than 20 books, 30 Reports for the Australian Government or other organisations, such as OECD or UNESCO, 60 book chapters and 40 articles. You have been a prolific and eclectic writer. The topics of your research range from communications and telecommunications, patents and technology, intellectual property rights and TRIPS, libraries and science policy, information societies and the knowledge-based economy, and more recently information sharing. Let us try to navigate a way through your intellectual journey as a research-active economist or scholar more generally. Now I'll put you on the spot. If you had to pick out a half dozen or so of your most important articles or books – the work that you are most proud of or that has had the most impact – which ones would they be?

The Penguin readings and *The Annals -Economics of information and knowledge* and *The Information Revolution*. Add *The Trouble with Technology* and the Introduction to what was an updating and reworking of the Penguin volume as *The Economics of Communication and Information* (1996) entitled 'Threatened Wreckage or New Paradigm?' Those would be the key items but many of the thoughts would have appeared in other papers and conference presentations. I am hoping that my current efforts on information sharing will yield an addition to the list. *The Economics of Language* (2002) marked some new territory but there are obvious links with the information sharing theme.

You've had a life-long fascination with the economics of information. We've talked about some of these things earlier, particularly the lack of reaction in the economics profession to this work on information. Yet you also mentioned in 2001 the Nobel Economics Prizes going to Joseph Stiglitz, Michael Spence and George Akerlof. Your own work is focused on knowledge and the capacity of people to make use of information and to profit from its availability. So the search for profit has become the search for information. Do you see yourself as someone who's perhaps worked in the wilderness in terms of Australian professional recognition but who has acquired satisfaction in seeing these Nobel Prizes going to people who work in this area, the feeling that now perhaps people are catching up to the shift you and other people were pioneering.

Yes, there is satisfaction. But there always have been anticipations. Peter Swann has sent me a copy of his delightful new book I mentioned earlier. He gives credit to Charles Babbage for his painstaking work gathering data on the economy of machinery and manufactures. I've known Mike Spence's work for a long time and there was a stage earlier on, before the Nobel award, that I prevailed upon him to come as a visitor to the University of Queensland, Economics Department. The reaction did tend to be 'Who's he?' but I was delighted he was willing to come. Unfortunately, he withdrew because he was elected chairman of the Harvard Department. While I was at Case Western Reserve, Shackle had accepted my invitation to visit but illness prevented his coming.

I like to think that the area of shared interest – the economics of information and knowledge – has moved to centre stage. Far too much of the discussion still fails to look beyond the technology. We need to remember that technology is not machines but useful knowledge and to be alert to Tony Oettinger's warning; flesh and blood minds have a monopoly on meaning. The changes in technology are affecting the expenditures, the occupational structures, the locations, and the behavioural patterns to an extent that we didn't feel need to worry about in the past. So I rather expect there will be more shifting in that direction. If you look at the *American Economic Review* and *The Economic Journal*, for example, the proportion of papers devoted to or at least touching on these topics seems to have increased sharply in the last five years. The changing structure of the workforce too has loomed much larger in recent times and this is reflected in policy debates.

A great deal of what happens in technological change and science has its origin in the military. So Galbraith's military industrial complex is much in need of a rethinking. Margaret O'Mara's *Cities of Knowledge*, is a good contribution on the theme that the Galbraith complex was the original venture capitalist. I'm not sure about the word 'original' because I think that if one goes further back in history there is earlier evidence. Michael White, *The Fruits of War* (2005) has some fascinating cases that should be followed up. On the American scene we're perhaps seeing a new focus concerned with the disaster resilient society - a blending of 911, the New Orleans cyclone and Middle East events.

Let me now turn to two reactions to your work. The first one is by someone from the University of Queensland. Jason Potts, in an article titled 'The Prometheus School of Information Economics' (*Prometheus*, 2003, 21;477-86), finds that information economics has been under-represented in the Australian economics journals and is virtually synonymous in this country with *Prometheus*. Moreover, *Prometheus* papers tend to be less mathematical and discursive than the standard academic articles on

information economics that focus on information as a signalling issue that can impact on the efficiency of market outcomes. In contrast the *Prometheus* approach is to see how information is used in terms of production, capital and organization. In this process there has emerged 'perhaps the only uniquely Australian school of economics' with a pragmatic industry and policy-focused approach to knowledge and information.

This whole development he largely places in your lap. Potts says your seminal 1984 paper on 'exogenous factors in economic theory' – with the plea to make information and knowledge endogenous to the production function – laid the foundation for the *Prometheus* school of information economics. Moreover, in the mid-late 1980s *Prometheus* had already identified the trends and staples of the top theory journals 15 years hence. Potts describes the evolution of *Prometheus* from a concern with information production to a focus on the information society and to currently a concern with the knowledge-base for an evolving economic system. Do you accept this characterization? How do you react to these statements?

As the subject of this statement, I would be pleased if it were true. I am not really the person to make such a judgement. One could put the difference in style in *Prometheus* aside because we were committed to communicating with a wider audience. And those who were totally committed to the standard economic perspective were going to be very difficult to persuade. We were seeking change in a very basic paradigm - all the way through from their recruitment processes. Everything has to change before you get another *New Economics*. And then further down the track the continuity will reassert itself. Remember that it was in 1976 that the American Economic Association created a special category for information economics. That was already well into the revolutionary process. Even then information economics had to compete with the ICT story where growth and novelty carried a lot of weight.

But the real issue should be what role is assigned to knowledge. Machlup wrote a little – only 3 pages - paper on the optimum utilisation of knowledge which is one of those beautiful little pieces, with no equations, but the basic ideas were there. The new developments have been capturing the interest of more PhD students and there has been some support from the Press. Unfortunately, it is too often cast in terms of the machines rather than knowledge and knowledge use but some of the new thinking has been getting through. Debate about policy has often failed to get beyond the access aspects...computers are made the source of all progress.

Tony Oettinger at Harvard deserves credit for his programme in information resources policy and his emphasis on flesh and blood minds having a monopoly on meaning, which rather conflicts with the trend to neuroeconomics. But somewhere in the mind, it is meaning that really registers and that is the challenge to the universities, as I see it, to provide teaching that gets that monopoly in focus. Curiously, Tony was a professor of applied mathematics and a professor of linguistics. His efforts have something in common with the Columbia University seminar. His programme had just started when he contributed to *The Annals* issue on *The Information Revolution*. His centre has been supported by major American business concerns. Why don't we have such support in Australia?

Let me turn now to a very interesting paper by Gilles Paquet 'Lamberton's Road to Cognitive Economics' (pp.63-79) in S. Macdonald and J. Nightingale (eds) *Information and Organization; A Tribute to the Work of Don Lamberton* (Elsevier Science,

Amsterdam 1999). He places your work in the Marshallian tradition that gives much importance to knowledge and organisation – with fellow-travellers like George Shackle, Philip Andrews, George Richardson and Brian Loasby. Indeed, he states that 'Lamberton is a Shackle who continued to hope that some reconciliation of Marshall and Walras was possible' (Paquet p.71). On the next page he labels you a 'reluctant or closet Austrian Marshallian' (p.72) which apparently means fusing the pragmatic and non-mechanistic approach of Marshall with Hayek's centrality of knowledge and coordination. He concludes by calling you a 'crusading hedgehog' (p.76). Do you accept any or all of this characterization? How do you react to this representation of your work? Has he got a vivid imagination?

Well, he may have that too. I think a careful fifth or sixth reading of that essay shows he has got a lot right. He's saying I've avoided a head-on collision with mainstream thinking. I've said its practitioners were wrong but I guess I could have campaigned more aggressively. I've been presenting an alternative viewpoint and posing different questions. That works well with good students doing research. It doesn't necessarily work well with the Press or with politicians. They tend to want something fairly clear-cut - the more opposed things are the better the story. I've read Gilles' chapter several times and I don't take offence because I am mindful of how difficult it is to persuade or to interest people who are deeply embedded in what I call a somewhat old-fashioned view. It's also true that this takes us into the world of the mental and intangible. Many of my fellow economists prefer to live with things that are physical and easily countable.

I guess I had rebuffs from people when I tried to persuade them and I had to put it down to either my communication failure or their stubbornness. But he's right in saying that as I sifted those different literatures and as I've returned to the basic themes over the decades, I was quite persuaded, as Shackle put it, that economists, classical or otherwise, were only concerned with income and tastes. But there was an inconsistency. People had knowledge and it was widely assumed they were pretty well-informed – they were well-enough informed might be a better way to put it.

Once you change the emphasis and make the main activity knowledge production and use, then you're obliged to question those basics and that means you have to challenge a great deal of the orthodoxy.

Having gotten so far, I have felt that I needed something more to clinch the argument or even to get the hearing that I would like to have. So I've gone along, as Gilles puts it, without the full-scale confrontations. You can't command reflection and I probably have failed to seize some opportunities. I haven't been as forceful as I might have been. I did join the debating society when I was first an undergraduate but I should have acquired more debating skills.

Gilles also tends to see cognitive economics as the road I should have taken – and may yet take! For me, cognitive economics is not a wholly separate path, nor is it new. Shackle was pretty much cognitive economics. I feel I'm trying to avoid being confined in a too narrow space. There are too many schools of thought that tend to emphasize one or a few elements. We find the 'one right answer' view amongst economists too. Such product differentiation is understandable but to locate in a particular school may prove restrictive. The synthesis may not be complete...perhaps cannot be complete in a changing world. I've been trying to follow new developments in, for example, neuroeconomics. There would appear to be some successful enterprises being built up on not all that scientifically well-based interpretations of

the electrical impulses in the brain. And, more generally, I'm not at all clear how cognitive economics as such becomes the basis of social action.

The policy implications are not clear cut?

Even the alternative courses of action are not clear-cut. There are indistinct signposts to the 'promised land'. I find it interesting that in that massive Derek Jones *Handbook of the New Economy* (2003), the editor says at the beginning that most of the contributions are from the neoclassical point of view. Does that mean treating knowledge production as just another industry?

I'll just get your impressions on a few more things. Do you see any particular stages in your intellectual journey, pivotal periods where you thought about new directions?

The stimuli when I've changed direction or taken up new approaches are not easy to identify. I can easily pick on someone and say that person was a decisive influence. Some are obvious lasting influences while others don't pay off. It goes back to the creativity theme. Some things do rub off and that is the idea of clustering. I think the important issue you are raising is the process of knowledge production and how it works. You can either think it is part of, as E.R.Walker put it, day-to-day happenings or you can think it is highly specialised. I guess there is room for both. A lot of standard economics, division of labour and all that, suggests that is so. Can it be fostered? Can it be identified in advance?

I don't think the current methods of recognising work really gets at that at all. The kind of scoring that goes on and publications counts under the present accounting system are just nonsense. It completely fails to recognise that the supplier adapts to these constraints. If a researcher can't fit in the specified categories, he/she will address the formalities and get the appropriate publications. The pity of it is that the institutions are going along with this system. They too are adapting to it. The issue is how to foster real contributions. US psychologist Simonton sees creativity as dependent on chance, logic, genius and *zeitgeist*. Unfortunately, commercialized university structures may become no more likely to maximize creative output than other industries and yet will be subject to the same tendency towards organizational obsolescence that all organizations face. Our best prospect is getting together a likely group of people in a research cluster, facilitating their interaction with other like-minded venturers of different persuasions, and recognizing above all that tight time management can have disastrous consequences.

We might note the thoughts of Californian poet Denise Levertov:

*As one goes on living and working, themes recur,
transposed into another key perhaps.
Single poems that seemed isolated perceptions when one wrote them
prove to have struck the first note of a scale or melody.
It happens at times that the poet becomes aware of the relationships that exist between poem
and poem; is conscious, after the act, of one poem, one line or stanza, having been the
precursor of another...*

If this is the 'production function' for knowledge, we need to ask what are the appropriate time dimensions, what are the appropriate forms of organization, what are the needed funding arrangements, what are the best dissemination arrangements, and what incentive systems might prove supportive? Currently, we may have a colossal mismatch in terms of scale, forms of organization, and time perspective.

I'll now go on to service issues. I have spoken to some of your former students. One of them says that you were a 'very congenial and enthusiastic teacher. What I particularly remember is that he seems to have a very prodigious memory in terms of references. He was right on top of his subject.' And others said that you were a most charismatic lecturer, enthused with peddling ideas, surrounded by a small group of devoted followers, won over by your more realistic view of the competitive process. What really stands out, speaking to people, is the enormous amount of supervision you undertake. Presumably you don't have any idea of how many postgraduate students you supervised but there must be a legion of them. The other thing which stands out is the multidisciplinary approach to research which is very different from, say, a standard economics supervision. Any particular students stand out or any reflections on that supervision process?

I mentioned John Beggs as in my view a loss to the academic world. So too was Ross Fisher through early death. It would be invidious to try to select from a very long list – Ann Moyal mentioned 'a regiment'! I meet people who could have done – were inclined to do - different theses. Sometimes it is *the* commitment of their life. Supervisors and the committees that decide on admission to programs need to think very carefully about the student's inclinations and capabilities as well as the university's sources of support. Organizational obsolescence is inherent in information resources but fostering talent and innovation can be an escape route. I find that getting a really good student in an area that impinges on my own, a student with whom I can interact because I am asking questions and wanting to learn, works well. They get their degree, I learn, and they become acquainted with the research process. A simple churning through is all too common and the topics get tampered with in order to fit them to the time and the funding. Interdisciplinarity may seem a complication to be put aside but it should be a necessary, socially valuable, and exciting part of the process. A creative industry approach is a modernization of Schumpeterian innovation – and a useful reminder of the need for historical perspective.

Those that I spoke to stressed two things about you. The first is the inexhaustible flow of ideas and questions that you generate, questions and more questions. You are regarded as a gadfly, an ideas generator, a catalyst to get other researchers thinking and working in different ways. Related to that is your breadth of reading in various disciplines and your rebellion against the splintering of knowledge into academic subdisciplines. The second thing they mention about you is your networking skills, the vast array of contacts you have internationally and locally. Would you like to comment on those two observations?

Networks are vital. I guess some of mine are dying off but I've always thought I've had the benefit of travel and contacts, and that it was the fit and proper thing to do to use that asset for the benefit of my students. There used to be an idea of the scholarly community and I think it is quite consistent with that to bring people to the notice of others if I think they have

real talent. The questioning has to be cultivated. As a child I was asking questions of what was not there on that bit of farm land and I was encouraged to think that way. It's been a long road from that farm. There were many people on the way who contributed, starting with family. Occasionally, I meet up with a genuine student who does not have family support and who has financial battles. I know adversity is said to be character building but it does have destructive effects.

As far as possible, policy for the knowledge economy should facilitate knowledge production and use for social benefit and that brings us back to the big issue of the whole economic analysis; the criteria of performance, and the simple market solution which has a lot of weaknesses. One aspect of modern industry that I feel strongly about is advertising. My early economics at least acknowledged that there were two dimensions of advertising, informative and persuasive.

The general view was that often it was self-cancelling with no overall effect.

I'm not comfortable with the cancelling out view. Most ads convey little or no information about either price or quality. Some people have been thinking that when government advertises and uses its massive budget for that purpose it ought to be in a different category. I have sympathy with that view. It's a pretty lopsided community situation when you are taking a position opposed to that of the government with its resources. I'm commending a book by Paul Rutherford. He has a nice analysis of 10,000 advertisements in Canada. When I'm told that the media and the advertising people are creative people, I wonder how creative they really are and I ask whether they should be funded by government. It does not have the same justification as funding R and D, fostering innovation, education, or just information dissemination

I think it comes back to what is really bugging me at this stage; the sharing and the use of information. If government is promoting certain information, then it is no longer just creating access. Why should some things be supported beyond access and others not? The real issue is that such promotion can foster inequality. If we are thinking of fairness as having some relevance, then this situation should be questioned. As I said earlier, take-up should be the beginning of the story not the end.

You spent a lot of time editing journals, editing research volumes. We've talked about *Prometheus* but there is also *Information Economics and Policy*. You've been on the editorial boards of a number of other journals like *Telecommunications Policy*, *Economics of Innovation and New Technology*, *Human Systems Management* and *Future Research Quarterly*. I do know what is involved in editing a journal. It's terribly time consuming and certainly not highly rewarded in the profession as such. But you do a lot of it? Why?

It's not highly rewarded by the publishers but you get a pay-off in terms of the access to the literature and the novelty of some of the things you are editing. I think editors have to be very very careful to preserve the property rights of the authors and I take that as a general requirement. So that's the first thing about it. The second is that it has a role in developing ideas, it's like a teaching role. You get a paper and it might be breaking new ground. It isn't a simple matter of accept or reject. An editor should be looking for innovation and helping advance that element while keeping it in perspective. That is what keeps me involved. It doesn't pay and the editorial function is not recognized officially as a part of the research

process. But I have had authors say their referee reports were superior to anything they received from their PhD supervisors and examiners.

You have worked on a number of committees of inquiry, task forces, authored numerous government and other reports for all sorts of institutions. I guess from your early responses you feel that this getting your hands dirty in particular industries and organisations is a crucial stimulus that allows you to find answers to questions and motivates further research. You have been a consultant to OECD, UNESCO, UNCTC, ITU, ABS, Australia Post, Prices Surveillance Authority, Public Service Satellite Consortium/NASA, Telstra, Commonwealth and State government departments and various industries. You were a member of the Board of the International Telecommunications Society from 1991-2001. What are the professional benefits of this sort of activity? Does it provide the stimulus for new research questions and shape research agendas. How fertile is the academic-government-industry interaction?

It is an opportunity to produce and disseminate knowledge and it also partly redresses the problem of mismatching of mindsets. You can often be surprised by outdated and rigid views of people in powerful positions. This comes back to the point I made earlier about Solow's criticism of management and administration. Some of the people handling those important matters do not have broad perspectives.

Library resources fitted easily with information economics. I have had a specialised interest in IP ever since I joined the Commonwealth Government committee of inquiry on industrial property, which was the first such inquiry in Australia. There have been others since then. I gathered the Treasury had suggested my involvement because otherwise it would have been just lawyers. Such committees of inquiry need wider representation; expertise is vital but it can combine with vested interests. Marine industries were another interesting case because it tended very much to be the people engaged in the marine industries and not those who were affected by its operations. Such committees are supposed to be knowledge producing ventures as well as policy design ones. They need first rate opportunity to access knowledge. If the report is in the hip pocket of the chairman, as is often suggested, then the knowledge assembling process is thwarted.

In many reports prepared by small groups of economists, the key questions tend to be shaped in terms of the neoclassical framework. This is justified on the grounds that the issues are complex and people will not be able to cope. The alternatives are reduced in that way. This isn't the way it should happen. The aim should be to achieve some real appreciation of the complexity of the situations that they're investigating. The best item I could put before the committee on marine resources was *The Economist's* three pages on how to catch fish. The people on the committee did not think very much about catching fish and yet they were making important decisions about that activity I think it really comes back to the fact that for both management and policy purposes, decision makers really need to know something about the industry and its technology. It is not in the textbook framework that you find the answers.

We come to the last question. It's been a long session. You have spent time at a number of Australian universities but also a number of international locations; Oxford, UCLA, University of Michigan, University of Tel-Aviv, Strathclyde University and Massey University. You have visited numerous other places and been funded by the ARC,

Australia-China Council, ASTEC, East-West Center, OECD, Reserve Bank of Australia, Rockefeller Foundation, Spencer Foundation and SRI International. You have won awards for your contributions to Information Science and Communications Research. One certainly gets the impression that your standing in the international community of scholars far exceeds your profile locally among academic economists, other than those of your own research network. Is this because you are asking deeper questions than the conventional economist, or because of your demanding multidisciplinary approaches, or is it because you are too far ahead of the game?

A knowledge economy requires a multidisciplinary approach. The static production function has to be replaced by process analysis. The worksite for a knowledge economy spans countries and long years. History and especially the history of science and technology, i.e., useful knowledge, have to provide the needed perspective. Division of labour and spatial constraints are changing drastically. If this is the reality, then most economics textbooks are thoroughly misleading.

So, yes, I am out of step with the profession and I feel more at home with imaginative minds who contemplate any number of futures. At a PhD level, I'd like to be sure students appreciated Joel Mokyr, *The Gifts of Athena*, the Elgar update of my Penguin *Economics of Information and Knowledge*, Peter Swann's *Putting Econometrics in its Place*, and, yes, Denise Levertov's poems.

Do you think the economists are by and large conducting a conversation among themselves?

Much of the time, yes, and that is part of the problem with that big volume on the *New Economy*. They are forcing the world that they are beginning to glimpse back into an old mould. That's why I wish to go back to the inter-disciplinary, Columbia Seminar approach. I think something like that should be an ongoing kind of effort to escape the consequences of the division of labour. There are implications in a whole lot of different settings, dependent on the activities; science policy, technical change impinged on by the military, health, the disaster-resilient society, etc, etc. But don't overlook the need for technology assessment. It has to be done in a sensible way and that is not by asking the existing major firms to outline their preferred futures. Done well and carefully, such forward thinking can serve as a unifying and educational process leading to wiser policies on the part of firms and governments.

Don, I've asked lots of questions, taken up a lot of your time. Perhaps this is a good time and place to stop. Any other areas that we need to explore?

I still haven't explained the STEP seminar which has been an important activity for me. Jane Marceau was the innovator and I have been the organizer for the last decade and more. STEP stands for Science, Technology and Economic Progress – although I have no difficulty if P is thought of as Policy. The first STEP met at ANU in 1991. A pattern was established. A group of not more than 25 PhD students is drawn from a number of universities, selected to ensure a good mix of universities, disciplines and stages of thesis work. Recognizing that many, perhaps most, theses tend to become more specialized as work progresses, we sought to open minds to the gains from a wider perspective. We did this by interweaving student

presentations on their own work with contributions on an inherently inter-disciplinary and topical matter. This year, for example, we'll be hosted by the University of Canberra with the 'theme' of security and the disaster-resilient society.

Motivated by Paul Samuelson's comment that our fellow students are our best teachers and harking back to my Nuffield experience, the students present on their own research and are encouraged to engage in vigorous discussion. They also work as a group to produce a report on the 'theme' for presentation at the final session. It can be good fun as when we met at Deakin University and considered the moving of the hazardous chemicals site from Melbourne to a new site across the water from Geelong.

For 16 years now one or other of the Australian universities has sponsored STEP. There seems to be general agreement that it has been a worthwhile venture. Unfortunately it doesn't seem to fit within disciplinary funding arrangements. However, like *Prometheus*, STEP achieves a good mix; science, technology, and economic progress/policy.....and for me there is plenty of scope for information economics.

I can't think of anything else. What about a cure for old age? There is much I still hope to do.

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Selected Publications by Donald Lamberton

- 2002, *The Economics of Language* (ed.) Edward Elgar, Cheltenham.
- 1997, *The New Research Frontiers of Communications Policy* (ed.) North Holland, Amsterdam.
- 1996, *The Economics of Communication and Information* (ed.) Edward Elgar, Cheltenham.
- 1995, *The Future of Telecommunications* (ed.) North Holland, Amsterdam.
- 1988, *The Cost of Thinking* (ed. et al.) Ablex, Norwood.
- 1983, *The Trouble with Technology* (ed. et al.) Frances Pinter, London.
- 1982, *Communication Economics and Development* (ed. et al.) Pergamon, New York.
- 1974, *The Information Revolution* (ed.) Annals of the American Academy of Political and Social Science.
- 1972, *Industrial Economics* (ed.) Penguin, Harmondsworth.
- 1971, *Economics of Information and Knowledge* (ed.) Penguin, Harmondsworth.
- 1971, *Science, Technology and the Australian Economy*, Tudor, Sydney.
- 1965, *The Theory of Profit*, Basil Blackwell, Oxford.

