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Convergence in Action

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Abstract

This article describes the key events leading up to the formation in 1960 of the Computer Society of South Australia, the first State-based computer society in Australia. It proposes that an understanding of the convergence of requirements (between administration, academia, industry and to some extent the military) was important in identifying the opportunity and bringing the main contributors together. It suggests that such an approach may be useful in similar circumstances today. The key role played by Professor Ren Potts of the University of Adelaide is emphasised. Some of Professor Potts?s other activities of relevance to telecommunications are outlined.

Introduction

The story of the founding in 1960 of the Computer Society of South Australia, the first of five State-based societies that came together in 1966 to create the Australian Computer Society, has some lessons for the contemporary world. It shows how recognising a convergence of requirements can lead to new and more significant outcomes. It shows too that the alignment between academic and commercial interests need not be only about intellectual property and commercialisation, as is common today, but may involve bringing people together in less formal ways. And it demonstrates, once again, that foresight and leadership are important in creating new directions.

The prime mover in the formation of the Computer Society was Professor Renfrey Potts, then a recently appointed Professor of Applied Mathematics at the University of Adelaide. Professor Potts, who later played a part in boosting telecommunications research in Australia, was an early advocate of computing knowledge for engineering students. The founding of the Computer Society largely followed from his actions in the preceding few years.

Replacing Punched Card Equipment

The origins of computer science at the University of Adelaide and the formation of the Computer Society may seem absurdly prosaic in today?s environment. Ren Potts became aware, somewhat fortuitously, in late 1959 that the

university administration was about to upgrade its punched card equipment used to keep track of student enrolments and results. Punched cards were then a standard way of storing and maintaining information that would today be held in relational databases. New information could be added to the cards when it became available, so that, for example, a student?s enrolments could be tracked. Punched cards could be sorted in many ways ? to provide alphabetical lists of students enrolled in a subject; or to identify all students with a required set of pre-requisites.

A whole ecosystem of ?business machines? had grown up around the punched card ? to create, read, sort, tabulate and summarise data. The IBM 407 Accounting Machine (Wikipedia 2014 [5]), for example, could total values on cards, make simple decisions and print results. It could also feed a punch to output punched cards of results, which could then be the input to a downstream process. The IBM 407 was ?programmed? using a patch panel. Upgrading the punched card equipment could lead to faster sorting, more capable tabulation and more options for programming.

Ren Potts knew, however, that the digital computing revolution was about to transform business processes, as well as provide new capabilities for academic research and education. In early 1960, he took the initiative to set about the identification of all the university?s computing needs. A Punch [*sic*] Card Equipment Users Committee was formed, bringing together potential users of computing from various departments and the university administration. Under Potts?s effective leadership, the committee acted swiftly to recommend the formation of a ?computation centre? for the university. The centre would support all the university?s computing requirements, including those of the administration.

At the core of the committee?s recommendations was the identification of a commercial computer and compatible punched card peripherals. The use of a commercial computer would mean that the computation centre could grow and become more capable as the digital computing industry developed. In addition to the computer and peripherals, the committee also identified other facilities and estimated the number and type of staff that would be needed to run the centre.

The university computing service began operation in 1961 with some punched card equipment and a share of time on an IBM 7090. The university?s first central computer, an IBM 1620, was operational by May 1962. In the late 1960s, the computer centre acquired a Control Data Corporation CDC 6400, said at that time to be the most powerful computer in the southern hemisphere.

Early Computing in Adelaide

The beginnings of digital computing in Adelaide benefitted from the establishment of the Weapons Research Establishment (WRE) in nearby Salisbury in 1955. WRE had acquired an early digital computer, the Elliott 403, christened WREDAC, from Elliott Automation (UK) in September 1956. It ordered an IBM 7090 in 1960.

WRE also employed an entrepreneurial computer enthusiast, Dr J. A. Ovenstone (later to become the first Professor of Computing Science ? ?Computing Science? being his preferred formulation ? at the university). Encouraged by Ovenstone, Potts had spent the summer of 1956/57, very soon after WREDAC had become operational, learning to program the computer in its native machine code (there being no high-level languages available). Fortran, the first high-level language, only became available with the IBM computers later in the decade.

Ovenstone was a promoter of digital computing and, among other things, organised a major conference at the WRE in June 1957, attended by many notable English pioneers in computing, including Maurice Wilkes from Cambridge, that stimulated further interest in computing in the Adelaide community.

In February 1959, Professor Potts and some of his students, along with others from the university, attended the first Fortran (actually Fortransit, a transitional version of Fortran available on the IBM 650 series) short course provided by IBM in Adelaide. From then on until the mid-1970s, Fortran became the high-level language of choice for university research, administration and teaching. From the mid-1960s, applied mathematics students were required to learn some Fortran for numerical analysis methods and further computing exercises were added to other mathematics and engineering courses progressively throughout the 1970s.

Computer Society of South Australia

Professor Potts saw the opportunity to harness the interest in computing within the general business community together with the enthusiasm within the University of Adelaide. Encouraged by the local IBM office, he wrote and circulated a notice proposing the formation of a computer society. The first two sentences read (Kidman & Potts 1999 [6]):

Many achievements of modern science have quickly become an accepted part of everyday life. Few, however, are likely to have such a direct and revolutionary effect on so many different spheres of human activity as the electronic computer.

Even Potts, who showed great foresight over the years, probably could not have envisaged in 1960 just how true those words would become.

A formative meeting, attended by over 150 people, was held on 24 October 1960 and Potts was elected president of the new society. At the first meeting in November 1960, at which the name ?Computer Society of South Australia? was adopted, the speaker was David Elliott, then a Senior Lecturer at the University of Adelaide and one of Potts?s PhD students. (David Elliott went on to become a long-serving Professor of Mathematics at the University of Tasmania.)

From then on, the Society held approximately monthly talks at which many of the early Australian pioneers of computing, including Trevor Pearcey, spoke. The Computer Society of South Australia was the first of five State-based societies that came together to form the Australian Computer Society on 1 January 1966.

A Note on Cirrus

One complicating factor in the University of Adelaide?s decision in 1960 to obtain a commercial computer was that the Department of Electrical Engineering had embarked on designing and building an in-house computer called Cirrus. This was offered as the basis for the university?s computing service once it was operational.

Potts?s committee, while supporting the development of Cirrus, also promoted the urgent need for a research and teaching computer that was compatible with the WRE facility and commercial punched card equipment, and had Fortran. Cirrus could not satisfy these requirements in 1961 and was not operational, in fact, until 1963 and then only in prototype configuration.

The installation of a commercial computer for university needs certainly diluted the emphasis on Cirrus and may have reduced its prospects for commercialisation. Pearcey suggests that ?the failure to follow up the Cirrus design was probably one of the greatest mistakes in Australian computing? (Pearcey 1988 [7]). The Potts committee should not be perceived at fault here: there was a general desire in the university to provide early access to computing facilities with a clear path to anticipated future growth.

Whatever may have been the views of the early computing pioneers, all was forgiven in 2004 when Potts was admitted to the Pearcey Hall of Fame in recognition of his contribution to early computing in Australia. His citation reads:

Emeritus Professor Ren Potts, Rhodes Scholar, Order of Australia, Ren was one of the first to learn to program and use the Weapons Research Establishment Digital Automatic Computer (WREDAC) in 1956, was responsible for establishing the University of Adelaide Computing Centre and was the inaugural President for the South Australian Computer Society in 1961.

Ren Potts and Telecommunications

It is worth noting that the Computer Society was not the only group that Ren Potts had a hand in creating. He was one of the first organisers of the Applied Mathematics Conferences, now called the ANZIAM conference, held in February each year. This helped to encourage a distinct identity for applied mathematics in Australia and led to the

formation of ANZIAM (Australia and New Zealand Industrial and Applied Mathematics), formally established at the conference in February 1975. For his role in promoting applied mathematics and ?his splendid achievements that have done so much to shape Industrial and Applied Mathematics in Australia?, Potts was awarded the first ANZIAM Medal in 1995.

Ren Potts had been a pioneer in early transportation science and became interested in operations research more generally during the 1960s. As he had done with computing, Potts encouraged the practice of operations research in South Australia by helping to found a local society for operations research. This brought together interested academics, trainers and a cross-section of industry practitioners in Adelaide for regular lectures and discussions. The local society became part of a national effort when the Australian Society for Operations Research (ASOR) was founded in 1972. In 1977, ASOR inaugurated the Ren Potts Medal to recognise individuals who have made outstanding contributions to the theory or practice of Operations Research in Australia.

While Potts and his students undertook research in a number of areas of operations research, the application area with the longest-lasting organizational effect was telecommunications. Potts recruited L. T. M. Berry (later a Professor at Bond University on the Gold Coast and RMIT University in Melbourne) as a research student. Berry wrote a thesis on telecommunications network planning (Berry 1971 [8]) and, with Potts?s active support, went on to develop a telecommunications research group at the University of Adelaide. In 1987, this group became the Teletraffic Research Centre with support from Telecom Australia. With ongoing funding from Telecom, OTC and their successor, Telstra, the Centre made significant contributions to teletraffic research and gained a substantial international reputation. Under the name TRC Mathematical Modelling, it continues today (2014).

For a more detailed account of the life of Ren Potts, see Campbell & Taylor (2014 [9]).

Conclusion

The formation of the Computer Society of South Australia in 1960 provides some insight into creating useful interactions between academia and industry. In particular, it shows that a convergence of requirements ? in this case between university administration, university teaching and commercial interests ? can help to forge new links between academia, industry and military research. These links need not be ?commercial?, as is often the case today, but may harness enthusiasm among all contributors to achieve valuable collaborations, especially the two-way transfer of skills and knowledge between industry and universities.

The story also illustrates that foresight and leadership ? in this case by Professor Ren Potts ? are key ingredients in identifying an opportunity and turning it into something of continuing value.

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The author also acknowledges many insightful discussions with Professor Peter Taylor of the University of Melbourne when the present author and Professor Taylor were writing the biography of Ren Potts published as Campbell & Taylor (2014 [9]).

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