

Counting Australia In

The Editors invited Professor Eugene Seneta to review “Counting Australia In”, the first and only book on the history of the mathematical sciences, including many aspects of statistics, in Australia. The result is a combination of personal history, reflection on the content of the book, and expansion on the book’s statistical aspects.

Introduction

There is a great deal about statistics, from official to mathematical, in the book, and I write this review primarily as a statistician for Australian statisticians. We are part of the mathematical community. Evgenii Slutsky, in the Preface to his first publication, a book in Russian of 1912 entitled *Correlation Theory* which to a large extent brought Pearsonian statistics to the Russian Empire, said “Every statistician should be a mathematician first, for our science is a mathematical science.” Slutsky started his career as an economic statistician, and oscillated between this and mathematical statistics, notably time series analysis and related probability theory dealing with statistical dependence. Economic statistics was perhaps the most important stream of statistics to interact with Pearson’s English Biometric School to form a unified coherent discipline, while retaining a separate quantitative identity. While the present book addresses economic statistics/econometrics up to mid 20th century, more would have been welcome about the academic subject area in Australia, as also about public health statistics, biostatistics and epidemiology here in the latter part of the century.

My review of this record is circumscribed by my own background experience within the community whose social history it chronicles. I was a student in the then Department of Mathematics, University of Adelaide in the years 1960-1964, with a 4th Year Honours project on random walks supervised by Professor Ren Potts, and considerably influenced by Mrs. Marta Sved. My M.Sc. work in 1964 was supervised by Dr. John Darroch, who was in the Adelaide department for two years within the period 1962-1964. He returned to that city as Professor (1966-1996) at the newly established Flinders University. The 4th year Honours class in 1963, due to hard work on restructuring courses by the two Professors, Eric Barnes and Ren Potts, consisted of a record number (about 16) of students, and included Rod Worley, Ann Pearson, Ken Pearson, Pender Pedler and Tony Andrews who went on to academic careers in Australia. Others in the group included Brian Bennett, Glen Thompson, C. K. Cheong, Winnie Tye, P.S. Khoo, T.C. Chye, E.B. Ooi, Baiba Vitols, and John Tomlin. 1963 was a fateful year in many ways. Returning by car from my last examination, in Science German, I saw a poster for Rupert Murdoch’s Adelaide

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Graeme Cohen. *Counting Australia In. The People, Organisations and Institutions of Australian Mathematics*. With a foreword by Lord Robert May of Oxford. Halstead Press in association with the Australian Mathematical Society. Sydney, 2006. 431pp. ISBN 1 920831 39 8.

The author stresses in his Preface, dated August 2006, that Chapter 10 is the requested history of the Australian Mathematical Society, but the book should not be regarded as a history of the Australian mathematics generally. Its scope is indicated by its subtitle, and it covers the period from Australia’s colonial beginnings (1788) up to about 2005.

The following is a table of contents and brief description of the chapters.

Foreword, Preface, Main abbreviations.

Chapter 1. Mathematics and the Beginnings of the Colonies.

Chapter 2. Mathematics and the Rise of the Universities. (Sydney, Melbourne, Adelaide, Tasmania).

Chapter 3. Mathematics Outside the Universities. (Royal Societies, Australasian Association for the Advancement of Science, Government and other statisticians, William Farrer.)

Chapter 4. Mathematics in the Universities in the First Half of the Twentieth Century. (Queensland, Western Australia, Sydney, New England University College, Melbourne, Adelaide, Tasmania.)

Chapter 5. Australia’s Mathematicians in World War 2.

Chapter 6. Post-War Mathematics in the Older Universities.

Chapter 7. Mathematics in Canberra’s Colleges and Universities.

Chapter 8. National Organisations and Mathematics. (Australian Bureau of Statistics, CSIR and CSIRO, Academy of Science, “Adding to Australia.”)

Chapter 9. Mathematics and the Later Universities. (Newcastle and Wollongong, Monash, other Universities of the 1960’s and 1970’s, former Institutes of Technology, Universities founded since the late 1980’s.)

Chapter 10. The Australian Mathematical Society.

Appendix 1. A Snapshot of Australian Mathematics, 1914.

Appendix 2. “The Spirit of Applied Mathematics,” by K.E. Bullen.

Appendix 3. Lists (mainly relating to the Australian Mathematical Society) .

Endnotes. (pp.381-410. These contain sources.) Name Index. (pp. 411-423.)

General Index. (pp.424-431.)

The author retired from the Department of Mathematical Sciences at the University of Technology, Sydney (UTS) in 2002 after 36 years there, experiencing its name changes and fortunes. This book, his first serious publication outside mathematics, has led to an M.A. in Public History from UTS to add to his M.Sc. (Sydney) and Ph.D. (NSW). The book is the culmination of the Australian Mathematical Society’s History Project, and has its origins in late 1999. The book is sui generis. Nothing of this scope has been undertaken previously, and for one researcher to undertake it and to succeed is astonishing. It brings the author’s career to an illustrious end. He will be remembered.

Counting Australia In

From page 1

News outside a shop, that President John F. Kennedy had been assassinated.

In the years 1960-1964 the academic staff of the Mathematics Department at various times also included Jim Michael, Maurice Brearley, David Elliott, Basil Rennie, George and Esther Szekeres, Reyn Keats, Maurice Grey, Kerwin Morris, Alf Cornish, Jane Pitman, and Rainer Radok (who had been one of the arrivals in Australia on the Dunera). Most of these occupy prominent positions in Cohen's account.

Some younger postwar immigrants from Europe round the time of the war, like myself, were just then completing their undergraduate studies. Another example, though not of Adelaide, who figures prominently throughout the book, and was closely associated with George Szekeres, a European refugee, is Alf van der Poorten. The Adelaide 4th year names also show strong evidence of Colombo Plan students, which resulted in many friends for Australia, mainly in Malaysia and Singapore. I still maintain contact with Cheong (formerly Executive Officer of Singapore Airlines, and now on the Board of OCBC) and Eric Ooi (we called him 001). The White Australia Policy was in effect at the time: I remember some wag writing on the blackboard before one of John Darroch's lectures in mathematical statistics "Keep out Bayesians, keep Australia bwhite [sic]".

I was first taught mathematical statistics at Adelaide University by Kerwin Morris, in a course then called Statistical Methods, a first course in the subject given at second year undergraduate level. Formally, the Professor of Mathematical Statistics in Adelaide was Edmund

Alfred (Alf) Cornish (1909-1973), a disciple of the great statistician Ronald Aylmer Fisher who was spending the last years of his life in Adelaide at the time. Kerwin Morris encouraged the Statistical Methods class to attend a seminar by Fisher, but I saw him only through the open door of the seminar room. I did later attend one lecture by Cornish, but it was too full of trigonometric expressions for me to continue.

In late January 1965 I joined the then Department of Statistics of the then School of General Studies (SGS), at the Australian National University (ANU), as Temporary Senior Tutor, and stayed until mid-1979. This teaching department, whose Head was Ted Hannan, was formally in the Faculty of Economics, and for all of my stay there was composed of both mathematical and economic statisticians, and catered also to students in the Faculties of Arts and Science. The 4th year Honours students generally were to be employed by the Canberra-based Australian Bureau of Census and Statistics. The ones I supervised for their projects included Kathy Kang, Susan Pentony (now Linacre), Phil Hughes and Suzanne Sheridan. My colleagues in the SGS Department over those years included Chip Heathcote, Warren Ewens, Chris Heyde, Deane Terrell, Tom Valentine, Ray Byron, Des Nicholls and Terry O'Neill, all of whom eventually attained Professorial positions in Australia.

The other statistical groupings in Canberra during my life there were Pat Moran's Department of Statistics at the Institute of Advanced Studies at ANU and the CSIRO Division of Mathematics and Statistics under Joe Gani.

Don McNeil and I had both come to Canberra to undertake our PhD's in

Statistics, and arrived at about the same time, first meeting in Pat Moran's office in January 1965. Cheong, my classmate from Adelaide, had just completed his M.Sc. in the SGS Department, and was likewise about to start his Ph.D. enrolled in Moran's department.

I came to the University of Sydney as Professor and Head of the then Department of Mathematical Statistics in mid-1979, succeeding the foundation Professor, Oliver Lancaster, with whom I shared an interest in the history of probability and statistics. The Professors in the Department of Pure Mathematics at the time were Tim Wall and Max Kelly, and in the Department of Applied Mathematics, Peter Wilson. John Robinson was promoted to a Personal Chair in Mathematical Statistics in 1991. I formally retired as Emeritus Professor in mid-2004. The vacated position of Professor of Mathematical Statistics was filled by Neville Weber in August 2005. Both John and Neville were members of the Department under Oliver Lancaster. The book misses Neville's elevation to Professor, although it captures a few events even from 2006, such as Peter Hall's Flinders Medal and Lecture at the Australian Academy of Science which actually occurred in April 2007, together with other awards of importance to Australian statistics.

My meeting with the book's author, Graeme Cohen, took place over lunch on Wednesday, 30 June, 2004. Subsequently I provided hard copy of obituaries of Harry Mulhall and Stephen Lipton, both of which had appeared in the *SSAI Newsletter*, and of my two obituaries of Oliver Lancaster, the more biographical of which, written jointly with Geoff Eagleson, appeared in the *Historical*

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Records of Australian Science (HRAS) late in 2004. Contact by email continued till 12 July 2005, when I made some minor corrections to paragraphs relating to Harry Mulhall and Oliver Lancaster.

Michael Adena said when requesting a review, that I have experienced a substantial part of the post-war history of mathematical science, and especially of statistics, in Australia, and my interest in history made me an eligible reviewer for the *SSAI Newsletter*. Michael and Alice Richardson wanted a less formal and chatty review than one which might be appropriate, say, for the *Australia and New Zealand Journal of Statistics*. Its personal perspective is also intended to provide additional information, in a small way, to that in the book.

Some Statistical Highlights

In his Foreword, Lord Robert May, formerly a Professor of Physics at Sydney University, finds a great positive in the “Australian ecumenism” of mathematics which the book reflects, and points out the impact of Australian applied mathematics and statistics on the world stage, singling out the mathematical genetics group stemming from Pat Moran. He points out, however, that the predominant focus of the book on institutions is on mathematics departments.

Some of the book’s highlights come from archival research, especially on staff records of universities. Among these was the discovery of an application of Thomas Gerald Room for the Chair of Mathematics in the University of Western Australia in 1928, six years before he gained the Chair at the University of Sydney, where he was Professor until 1968. Material was also found illuminating the “background to the antipathy between Room and Keith Bullen” at this university. Other highlight material includes the appointment of Thomas Cherry as Professor of Mathematics at the University of Melbourne, ahead of Norbert Wiener who was supported by a stellar cast of European referees, including G.H. Hardy, David Hilbert, Henri Lebesgue, Paul Lévy and Maurice Fréchet. Winer’s name now permeates the study of stochastic processes in continuous time and harmonic analysis, and he is credited with the discovery of cybernetics.

The book’s author was particularly excited about the discovery of the mathematical work of the surveyor Martin Gardiner in 1850-1870. He lists some 16 of Gardiner’s publications,

mainly in the Transactions/Proceedings of the Royal Societies of New South Wales, Victoria and Queensland. Publications of such “local” Royal Societies, in existence before the Federation in 1901 of the six separate colonies, continued to play an important part in the publication of Australian research until airmail made access to newly “international” journals easier. A case in point is that of Dansie Thomas Sawkins (1880-1950), who from 1922 to 1946 alone carried responsibility of statistics teaching at Sydney University, and published in the local journal which carried his obituary in 1950. (What evolved into the *Australian Journal of Statistics* did not come into existence till the late 1940’s.)

Sawkins’ work was publicized in the book *A First Course in Mathematical Statistics* (1946), of his Australian contemporary Charles Ernest Weatherburn (1884-1974) whose name occurs at many points in Cohen’s book. Weatherburn was Professor of Mathematics at the University of Western Australia since 1929. Both Sawkins and Weatherburn had applied unsuccessfully for the Chair of (Pure) Mathematics at the University of Sydney after Carslaw’s retirement in 1935. Sawkins was offered a Chair in Statistics in the Faculty of Economics, but took instead a Readership in 1938.

Weatherburn had at one time taught Edwin J. G. Pitman (1897-1993), Professor of Mathematics for 36 years from about 1925 at the University of Tasmania, who was also an applicant for the Chair at Western Australia. Together with Maurice Henry Belz (1897-1975) and Cornish, they formed the nucleus of Australian mathematical statistics in the first half of the 20th century.

Weatherburn’s book is dedicated to the great statisticians of that period Karl Pearson and Ronald Aylmer Fisher. In “an exhaustive and masterly report in 17 typed pages”, Karl Pearson had recommended Milne-Thompson for the Tasmanian chair; Pitman had not yet become interested in statistics. Later, Fisher played a decisive role in the appointment of Oliver Lancaster to the foundation Chair of Mathematical Statistics at the University of Sydney over Geoff Watson in 1959.

The Cohen book has (p.255), courtesy of the CSIRO, a photo of Helen Newton Turner and Sir Ronald Fisher sailing on Sydney Harbour in 1960. Betty Allan, Mildred Barnard and Helen Newton Turner, who had all studied with Fisher and who were the first three biometricians

with the CSIRO, are well remembered in the book. The first two, under conditions prevailing at the time, had to resign from the CSIRO following their marriages. They were replaced by George McIntyre and Evan Williams respectively, both of whom had distinguished statistical careers. McIntyre had studied under Weatherburn in Western Australia, and Williams under Pitman in Tasmania.

Early History and the Cambridge Influence

Chapter 1 is a prehistory of mathematics in Australia, and is presented by the author with a historian’s dedication. It foreshadows its bright statistical future. Arthur Phillip’s instructions on his appointment as “Captain-General and Governor –in-Chief of New South Wales” in 1787 required him to make regular statistical reports. He is rightly remembered as “the first Australian statistician”. The first census of the Colony of New South Wales was held in November, 1828. The first *Blue Books* of this colony and the Colony of Van Dieman’s Land were produced in 1822. Christopher Rolleston (1817-1888) presented a paper on the “science of statistics” at one of the first meetings of the Philosophical Society of New South Wales on 10 December, 1856. The first lecture on mathematics was given at the University of Sydney in October, 1852, but the emphasis in the early colonies was in application to areas of concern to the colonists, such as astronomy, commerce, surveying and statistics, and was supported by enlightened administrators such as Governor Brisbane. The means of elementary mathematical education were the schools and establishments of adult education, all amidst considerable sectarian influence.

The early history of mathematical science in Australian university departments was considerably influenced by Cambridge University, especially its St. John’s and Trinity Colleges. The first two youthful Professors of Mathematics at Sydney University, Maurice B. Pell (actually born in the U.S.) and Theodore T. Gurney were Fellows of St. John’s, and some of the other names of the early times (G.R. Smalley, F.B. Horner, and E.M. Moors – the first locally born academic mathematician and statistician) were also St. John’s men. The first two mathematics Professors at Melbourne University, William P. Wilson and Edward J. Nanson, were associated respectively with St. John’s

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**DEADLINE FOR
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Editorial

In this newsletter we are delighted to feature a book review that we hope will be of interest to a wide range of Society members. Professor Eugene Seneta has done so much more than merely tell potential what to expect in the book. If you have read a book that would be of broad interest to Society members, please write in and tell the Editors! Or, if you have read a book that deals with a subject about which you have some extra information to impart, write in and tell the Editors too!

This will be the last time a paper copy of the Newsletter arrives in your mailbox. Please remember to keep the Society up-to-date with your current email address, and check the SSAI website (<http://www.statsoc.org.au>) regularly in order to keep in touch with Society activities. If you do not have access to web or email,

please inform the Society office so that arrangements can be made for you to receive the newsletter.

To close this editorial, we note that by the time this newsletter arrives, the silly season will be under way. The Editors would like to take this opportunity to wish all Society members a happy Christmas, and a pleasant New Year. We would also like to thank all those who have contributed to the newsletter, whether by writing reports, taking photos or entering competitions. Thankyou also to the organizations who have supported the activities of the Statistical Society and its members – your input into successful Society activities is much appreciated.

The deadline for copy for the next newsletter is 10 February 2008 – enjoy the summer!

Member News

President of the Islamic Countries Society of Statistical Sciences (ISOS), Dr Shahjahan Khan (pictured), is scheduled to present a keynote speech in the First Arab Statistics Conference (FASC) organised by the Arab Institute for Training and Research in Statistics (AITRS) to be held during 12-13 November 2007 in Radisson SAS Hotel, Amman Jordan. The AITRS was established in 1971 to raise competencies and skills of the Arab Statistical Organisation. The conference is organised under the Patronage of his Royal Majesty King Abdullah II Ibn Al-Hussain of Jordan, and the session in which Dr Khan will present his keynote speech will be chaired by the Minister of Planning of Jordan, Dr Suhair Al-Ali. Australia



based academic, Dr Khan will speak on the Importance of Statistics in Development in line with the theme of the conference “No Development without Statistics.”

Conferences

Australian Statistical Conference 2008

30 June-3 July 2008, Melbourne, VIC — <http://www.asc2008.com.au>

International Society for Bayesian Analysis Conference

21-25 July 2008, Hamilton Island, QLD — <http://www.isba2008.sci.qut.edu.au/>

Australian Statistical Conference 2010

6-10 December 2010, Perth, WA

President's Corner

Shortly you will receive an invitation by email to participate in a member survey commissioned by Council in order to obtain your views. Data Analysis Australia has agreed to administer this web based survey and I thank them for their generous support of this activity. Please take the 10 to 15 minutes that will be required to complete it. It is critical that we have relevant and up-to-date data on the membership and their views. Like all surveys, there may be areas that you particularly care about but which are not covered. We plan future, shorter and more focussed surveys over the coming year. However, please bring any areas of concern to your Branch or Section representatives or to members of Council including me.

If you do not receive the email regarding the survey, please contact the SSAI office to request a survey form to complete.

In this newsletter you will find registration information about ASC2008 to be held in Melbourne. Planning for the conference, as well as for various satellite activities, is well advanced and I look forward to a very successful professional meeting. Planning has also commenced for ASC2010 in Perth. This will be held in December, concurrently with the Genstat Conference.

Since the last newsletter, I have emailed members seeking ideas for professional development and other specialised workshops. I have also emailed the Chairs of Sections seeking their input. There has been a good response to these requests and I am currently compiling a summary of suggestions for wider circulation and discussion. If you have not already contacted me about possible workshop or professional development ideas I would be pleased to hear from you. To those who took the trouble to contact me, I am very grateful and ask for your patience if you have not received a reply from me as yet.

Council met via teleconference in early November to pursue the main action items arising from the August Central Council meeting. We plan on meeting every three months in this way to ensure that plans and actions are pushed forward. Council amended regulations to formalize the role of Branch Presidents' Representative, which Alan Branford has been doing superbly for the past few years. In future, a similar position for Section Chairs will be established to assist in the communication between Sections and with the Executive. A Professional Officer Position Description was discussed in readiness for planning for continuing professional development

and workshop activities. Before Council proceeds with filling this position, on a part or full time basis, it has requested that a business plan for these activities be prepared by

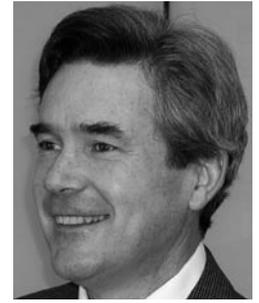
the Executive against which the costs of such a position would be allocated.

The August decision of Central Council to move the Newsletter to electronic access only was discussed and it was decided to revisit that decision once the results of the member survey are available, and after evaluation of lower cost options for printing the newsletter are assessed.

As many of you will be aware Jane Waslin, our Executive Officer for the past 4 years has resigned to pursue a full-time position – for details see the article by Doug Shaw. I personally would like to thank Jane for her wonderful contributions to the professional running of the Society and wish her well for the future.

William Dunsmuir

Email: W.Dunsmuir@unsw.edu.au



Member News

Michael Martin

Professor Michael Martin of the Australian National University recently received several awards from the Carrick Institute for Learning and Teaching in Australian Higher Education. In August, Michael was awarded a Carrick Citation for Outstanding Contributions to Student Learning with a citation that read "For nearly two decades of making statistics interesting, relevant and fun!", and in November, Michael received a Carrick Award for Teaching Excellence in the discipline category Law, Economics, Business and Related Studies.

Carrick Citations are awarded annually to up to 210 people over all disciplines at Australian universities who "have made a significant contribution to the quality of student learning in a specific area of responsibility over a sustained period." Carrick Awards for Teaching Excellence "celebrate a group of the nation's most outstanding university teachers in their fields. The awards give recognition to teachers (individuals and teams) renowned for the excellence of their teaching, who have outstanding presentation skills and who have made a broad and deep contribution to enhancing the quality of learning and teaching in higher education." (see <http://www.carrickinstitute.edu.au>)

Michael reflected on his teaching and his Carrick Citation:

When you hear something like "for making statistics interesting, relevant and fun!" you might wonder "can this be true? Interesting and relevant, sure, but fun??" or even "it's got to be some sales pitch!"

And maybe it is a sales pitch, of sorts, for what statistics as a profession might do to attract more people to study it and choose it as a job.

There is a (wrong) perception out there that statistics is either frightening or dull (or both) and one of the main challenges in teaching statistics is to overcome that perception and leave people understanding that statistics is directly relevant to their lives, vital (in the "alive" sense), and necessary in order to begin to understand our increasingly complex world.

This is my starting point for teaching statistics to undergraduates, one that I try to combine with a sense of humour and a determination not to get bogged down in jargon.

It is an approach that has worked well for me over many years, and, more importantly, one that I hope has worked well for my students. I've also worked hard at developing lots of good analogies for statistical thinking and techniques from real-life experiences. These have really helped me show students that statistics is neither mystical nor magical, but rather a way of looking at the world that unlocks (some of) its random secrets.



Why Accreditation is Critical

The statistical profession in Australia and around the world is under pressure from many directions. It sees statistical work being done by non-statisticians (often poorly) and new areas of research such as data mining passing to other professions in a way that often prevents statisticians being able to contribute. Ever growing computing availability increases these pressures.

Accreditation is a key element in the statistical profession's action against these trends. In Australia the system of accreditation evolved by the Statistical Society of Australia emphasises the outward face of statistics, providing standards so that those needed statistical advice know where to turn and providing a structure useful to those who want to develop a career in applied statistics.

Two levels of accreditation are provided. Graduate Statistician (GStat) status recognises the completion of an undergraduate level course with sufficient content and level in statistics, both theory and application. It marks the individual as being able to start a statistical career. An applicant may ask for accreditation on their individual merits, or through completing a course accredited by the Society. The standards are the same but an accredited course provides the surety

when beginning study that it will lead to automatic recognition. A number of universities in Australia already have accreditation or are in the process of applying for it.

Accredited Statistician (AStat) status provides a higher level of accreditation and applies only to individuals. It requires a combination of qualifications, ability and experience, and evidence must be provided in the form of documented work (papers or reports) and referees. An Accredited Statistician takes responsibility for their work and can be trusted for the quality of their advice. This is backed up by a requirement to uphold the Society's Code of Conduct and the review of accreditation every five years.

The Accreditation Committee of the Society administers the accreditation system. While the Committee sees its role of encouraging the accreditation process (and will often suggest improvements to applications if it feels that an applicant has not done themselves justice), it rigorously follows standards so that the terms GStat and AStat are seen as highly desirable and meaningful qualifications.

Much remains to be done. Ideally the profession should achieve a full professional status as is held by architects and engineers. The public expects that a

bridge they use has been designed by a qualified engineer to be safe. They should have the same expectation that decisions that affect their lives are based, where appropriate, on the proper statistical evaluation of the evidence carried out by a properly qualified statistician. We are a long way from achieving that but it should remain our goal.

I strongly urge all members of the Society to support our accreditation system. Statisticians who do applied work should seriously consider personal accreditation. Staff in universities should consider having their courses accredited. Employers should recognise the value in accredited applicants where appropriate. (We often overlook that some statisticians are employers of other statisticians.) We should all publicise it more widely.

The Accreditation Committee is currently updating the content of the Society's website relevant to accreditation, including fuller guidelines for both individual and institutional applicants. We aim to make the processes and expectations clearer. Anyone interested in accreditation is also welcome to contact me (john@daa.com.au).

John Henstridge

*Chair, Accreditation Committee,
Statistical Society of Australia.*

Election of Executive Members

Members are advised that the Executive positions of Vice-President (President Elect), Secretary and Treasurer will become vacant at the Society's Central Council Annual General Meeting in 2008.

The SSAI Rules provide for a Nominating Committee, consisting of the current Executive and the Branch Presidents, to solicit nominations and submit a list of nominees to Central Council. Should an election be required, Central Council will then arrange a ballot of all financial members of the Society.

Members of SSAI are invited to submit nominations for the three positions to be vacated. Nominations must be in writing and signed by the nominator(s), and must be accompanied by a written and signed statement from the nominee accepting the nomination.

Nominations should be submitted to the SSAI President (William Dunsmuir) or to a Branch President before 31st January, 2008.

*Doug Shaw
Secretary*

Society Awards

The Society awards a gold medal, the Pitman Medal, at most once annually, in recognition of outstanding achievement in, and contribution to, the discipline of Statistics. Honorary Life Membership honours outstanding contribution to the profession and the Society, while a Society Service Award may be awarded to a Society member in recognition of sustained and significant service to the Society.

An Awards Committee, chaired by the President of the Society, makes recommendations to the Society's Central Council as to appropriate Award recipients. Pitman Medals and Honorary Life Memberships are usually announced at the Society's Conference.

Members of the Society are encouraged to propose suitable recipients of the Pitman Medal, Honorary Life Membership or a Society Service Award. Suggestions, with brief supporting information, should be emailed to the President, William Dunsmuir, as Chair of the Awards Committee.

*Doug Shaw
Secretary*

Three Doors with Borek Puza (Edition 12)

Welcome to the 12th edition of *Three Doors*. Last time I presented The Alternative Confidence Interval Puzzle and am now pleased to announce Terry Neeman as the next winner of the Three Doors Prize, a cheque for \$60 as donated by SSAI. The solution to that puzzle is given below, and the next puzzle follows.

The Alternative Confidence Interval Puzzle

Suppose that a number y is randomly chosen from the uniform distribution from 0 to k , where k is an unknown real constant between 0 and 5. Consider the statement

$$0.8 = P(0.2T(k) < y/k < 0.8 + 0.2T(k)),$$

where $T(k)$ is a suitable function of k or a constant. For the case $T(k)=0.5$, the statement can be inverted to yield an 80% confidence interval (CI) for k given by $(y/0.9, \min(5, y/0.1))$. Now suppose that $T(k)=k/5$. Then the statement can be inverted to yield an alternative CI for k . Find the general form of the alternative CI and evaluate it for $y=3.0$. Why might the alternative CI be considered preferable?

Solution to The Alternative Confidence Interval Puzzle

With $T(k)=k/5$, the statement becomes $0.8 = P(0.2k/5 < y/k < 0.8 + 0.2k/5)$, which, by solving $y/k = 0.8 + 0.2k/5$ and $0.2k/5 = y/k$, leads to $0.8 = P(L < k < U)$, where

$$L=5\sqrt{4+y}-10 \text{ and } U=\min(5, 5\sqrt{4+y})$$

are the bounds of the required alternative CI. Thus, when $y=3.0$ the alternative CI is $(L, U)=(3.23, 5)$, whereas the 'ordinary' CI is $(3/0.9, \min(5, 3/0.1))=(3.33, 5)$.

An advantage of the alternative CI is that it exists for all values of y . E.g., if $y=4.7$ then $(L, U)=(4.75, 5)$, whereas the ordinary CI is empty (because $4.7/0.9=5.22>5$). Also, the alternative CI is shorter for many values of y . E.g., if $y=0.7$ it is $(0.84, 4.18)$ with width 3.34, whereas the ordinary CI is $(0.78, 5)$ with width 4.22. Furthermore, the alternative CI is shorter on average for many values of k . For example, if $k=0.7$ its expected width is 2.36, whereas the expected width of the ordinary CI is 2.83.

This discussion would not be complete without mention of the one-sided 'lower' 80% CI for k , defined by $T(k)=1$, namely $(y, \min(5, 5y))$. E.g., when $y=3.0$ the lower CI is $(3, 5)$, when $y=0.7$ it is $(0.7, 3.5)$ with

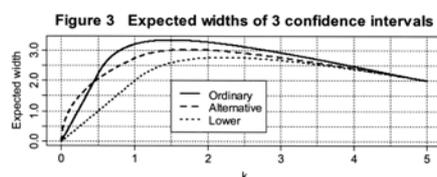
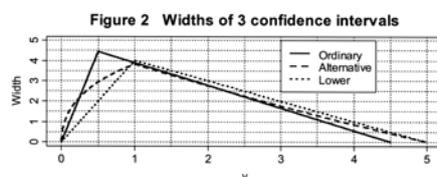
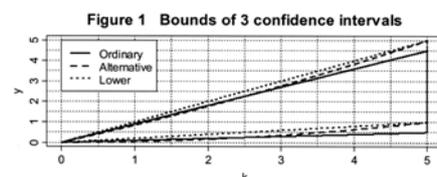
width 2.8, and if $k=0.7$ its expected width is 1.4. Like the alternative CI, the lower CI exists for all possible values of y .

Figures 1, 2 and 3 show the bounds, widths and expected widths of the above CIs. It will be seen that the lower CI is uniformly the best of the three as regards expected width (Figure 3) but not as regards actual width (Figure 2). (Note: In our calculations the expected width of the ordinary CI was taken as 0 for $y>4.5$.) For further discussion of 'alternative' CIs - and examples of their usefulness - see the following papers:

Puza, B.D., and O'Neill, T.J. (2006). Generalised Clopper-Pearson confidence intervals for the binomial proportion. *Journal of Statistical Computation and Simulation*, **76(6)**, 489-508.

Puza, B., and O'Neill, T. (2006). Interval estimation via tail functions. *The Canadian Journal of Statistics*, **34(2)**, 299-310.

Puza, B.D., and O'Neill, T.J. Optimal constrained confidence estimation via tail functions. To appear in *The Mathematical Scientist* in December 2008.



The Two Uniforms Puzzle

Suppose that X and Y are independent random variables, and each is uniformly distributed from 0 to 1. Find the density function of $U = X/(X+Y)$.

For your chance to win a fabulous mystery prize, please send your solution to newsletter@statsoc.org.au.

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ANZJS Corner

Over the last year the ANZJS Editors (Kerrie Mengersen, Jeff Wood, Ken Russell and Steve Haslett) have held a number of meetings, including the first face-to-face meeting of the current editorial panel in Sydney on 24 May 2007.

A number of issues were discussed at length.

The Editors have been considering content and direction for ANZJS. Of necessity, this is driven in part by citation indices, but we also recognise that there could be more local content, both in terms of authorship and focus, without detriment to either the Theory and Methods or the Applications sections. We have also discussed how to get more high quality applications papers submitted, and whether the criteria for acceptance of such papers needs reconsideration. We are advertising for a new Book Review Editor. We are looking medium term at a web-accessible system so authors and editors can better monitor submitted papers, and at whether we currently have the

best mix of Associate Editors to cover the very wide range of statistics papers submitted to ANZJS. We are working toward focusing some journal issues around invited papers and special topics, with submitted papers on the same or similar topics in the same issue. We are considering how best to support the editors and control workload through widening the group of people involved, for example, through assistance, particularly for Kerrie and Ken.

We were pleased to note that Blackwell, the ANZJS publishers, provide partial funding toward ANZJS operational expenses, and once this is available to the Editors from the two associations, there can be more operational flexibility than is possible at present. This could usefully include more regular meetings of the editors.

We are considering whether a questionnaire to you, the journal's subscribers, would be a useful way to canvas your views, and if so, what best to put in it.

A central, more long term question concerns Open Access, and whether this is the best mode for future publication of ANZJS. For those of you wanting to know more, there is a useful background article to which Murray Jorgensen provided a link. This is Jim Pitman's IMS presidential address devoted to "Open Access to Professional Information": http://www.imstat.org/news/ims_pres_address07.pdf The SSAI and NZSA executive committees plan to make sure there is extensive discussion on Open Access and ANZJS at the next joint meeting of NZSA and SSAI, likely mid-2008.

We think putting a regular column on ANZJS in the SSAI and NZSA newsletters could be a possibility. That way, we can outline what is happening at ANZJS in more detail, and get more timely feedback from you all.

Steve Haslett
T&M Editor, ANZJS

ANZJS – Technical Editor

The Australian & New Zealand Journal of Statistics is looking for an assistant Technical Editor. You will help the Technical Editor, Ken Russell, to maintain a high standard of presentation and readability for the Journal.

The work will allow you to get a good overview of what is included in ANZJS, before publication, and to understand the journal publication process more fully. You need to be good at spelling, grammar and punctuation, and meticulous in carefully reading manuscripts from authors and Uncorrected Proofs from the publisher. You need to care that the format is correct. It helps if you have a sense for when something in a manuscript 'seems wrong' (for example, a set indexed by a variable that doesn't appear in the definition of the set). You must have the time available to do the work well, and be able to schedule your time when there are production deadlines to be met.

Please contact Ken Russell (kgr@uow.edu.au) for further details. Please contact the Managing Editor, Kerrie Mengersen (k.mengersen@qut.edu.au), if you are interested in being considered for the position.

ANZJS – Book Review Editor

The Australian & New Zealand Journal of Statistics needs a new Book Review Editor. Responsibilities will include maintaining contact with publishers, finding suitable reviewers, monitoring reviews, and ensuring a steady stream of high quality book reviews for each issue of ANZJS. If interested, please contact Prof Kerrie Mengersen, k.mengersen@qut.edu.au. There is no fixed closing date. The vacancy will remain open until filled by a suitable candidate.

WORKSHOP

Advanced regression models with R
13 February 2008, Melbourne
For further information: www.statsoc.org.au/whatsnew

Farewell Jane Waslin

The Society has regretfully said farewell to its Executive Officer, Jane Waslin, who has left us to take up a new challenge in the business world.

Jane accepted the position of Executive Officer in early 2003, at a time when SSAI had taken a number of strategic decisions to increase the professionalism of the Society and the profile of the Statistics profession. That we have achieved as much of this strategic intent as we have in the subsequent years is due in no small part to Jane's efforts.

Jane has been responsible for the running of the SSAI Central Office, operating largely independently. During her time at SSAI, she has systematised and streamlined most of the office processes, resulting in efficient and well-understood procedures. As a consequence, the Central Office has been able to provide significantly improved assistance to the Branches, to the Society's committees, to organisers of conferences and workshops, and to the individual members of the Society. Jane also ably represented the Society at meetings and at public events such as the Society's conferences.

All of this was done in a cheerful and helpful manner, which reflected Jane's personality and her commitment to the success of the Society.

We wish her 'all the best' for her new endeavours.

Doug Shaw
Secretary



Spring Bayes Conference: Coolangatta, September 2007

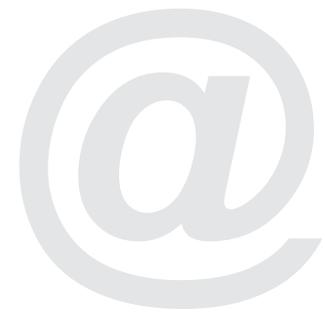
In September 2007, Bayesian Statisticians made their way to Coolangatta, Queensland for three days of presentations, workshops and just a little bit of beach action at the Spring Bayes Conference. Delegates from Taiwan, New Zealand, Perth, Melbourne, Sydney, Brisbane and numerous places in between all participated. Keynote speakers for the event were Adrian Barnett (University of Queensland), Cathy Chen (Feng Chia University, Taiwan) and Jean-Michel Marin (INRIA, France). It was wonderful to have such talented people sharing their research and we thank them very much.

The basic format for the event was oral presentations in the morning, workshops in the afternoon and poster presentations in the evening (accompanied by a tasty cold beverage). As conference numbers are kept small, each Keynote Speaker was able to give a workshop based on their work to roughly a third of all delegates.

Topics discussed during the conference obviously centred on Bayesian Statistics but ranged from the highly theoretical, to applied areas such as finance, ecology and remote sensing. Delegates seemed pleased to have the three different modes for communication of their research. Further, the "hands-on" nature of the workshops was well received.

The next scheduled meeting for Bayesian Statisticians is the World Conference of the International Society for Bayesian Analysis on the 21 - 25 July, 2008 (ISBAA 2008). The conference is to be held on the beautiful Hamilton Island and please refer to the website <http://www.isba2008.sci.qut.edu.au/> for further information. We look forward to seeing you there.

*Kerrie Mengersen, Mark Griffin, Kate Lee,
Chris Oldmeadow and Matt Falk*
Spring Bayes Organising Committee



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Counting Australia In

From page 3

and Trinity. The University of Adelaide in its search for the first Elder Professor of Mathematics, consulted Isaac Todhunter, a Fellow of St. John's; and the candidate chosen was the young Horace Lamb, a Fellow of Trinity. Todhunter is well remembered by historians of probability and statistics for his still widely used *History of the Mathematical Theory of Probability* (1865); and by this reviewer for his contact with, and probabilistic influence on, the Oxford mathematician Charles Lutwidge Dodgson ("Lewis Carroll", famed for his Alice books), on whose probabilistic work there have been articles in the *SSAI Newsletter*. Dodgson's 175th birthday anniversary occurs this year, and there have been accompanying celebrations in England and Canada.

Lamb was Australia's most notable mathematician of the 19th century. The second Elder Professor, William H. Bragg, was Australia's most noted physicist of the early 20th. Associated with Trinity and selected on the advice of J.J. Thomson, William and his son Lawrence (born 1890 in Adelaide), won the Nobel Prize for Physics in 1911. (The Braggs had left Adelaide in 1908.) William Bragg was a contemporary at Trinity of the Australian-born and educated W. F. Sheppard, still remembered for "Sheppard's corrections" in calculating moment estimates from grouped data. There was an Australian applicant for the second Elder Chair, William Sutherland (1859-1911) who discovered the diffusion equation which Einstein developed. Sutherland's results were presented to the meeting of the Australasian Association for the Advancement of Science held in Dunedin, N.Z., in 1904. Bragg gave the seminal address, to Section A, of this meeting.

The author writes in his brief, but as for all chapters, characteristically incisive, lead-in to Chapter 3: "There were four universities in Australia by the end of the 19th century and in the University of Adelaide, if not in the others, world class research in mathematics was being achieved. In all four, mathematics was being taught at a level comparable with British universities. ... Government statisticians in the eastern states in particular were also setting standards that would be viewed with admiration in

Britain and elsewhere." The government statisticians included Timothy Coghlan, Sydney born-and-bred, of whom there has also been some mention in the *SSAI Newsletter* (No.94, 28 February, 2001), but much more in the Bicentennial History Issue of the *Australian Journal of Statistics* (30B, August 1988), where Chris Heyde states that Coghlan's "work was hailed in the Journal of the Royal Statistical Society in 1898 as a pioneering work with no equivalent in Britain."

Statistical Science in the Universities

Horatio Scott Carslaw, Scottish-born and Fellow of Emmanuel College, Cambridge, succeeded Gurney at the University of Sydney in 1903. He retired in 1935, but collaborated with John Conrad Jaeger, a former undergraduate on the first book in English on the Laplace transform, *Operational Methods in Applied Mathematics* in 1941. Operational research overlaps heavily in content with applied probability in which non-negative random variables are of primary interest. My own introduction to probability was through Ren Potts who considered himself an operational researcher, with the study of operational methods encompassed by courses in both Pure and Applied Mathematics at Adelaide University.

First class Honours graduates from the University of Sydney in the first half of the 20th century included not only later statistically important figures such as Weatherburn and Belz, but also a name prominent in Australian political history, Herbert Vere Evatt, who also obtained first class Honours in English, and was Leader of the Labor opposition in the era of Menzies' Government.

Thomas Gerald Room, a Fellow of St. John's from 1925, arrived in August 1935 to succeed Carslaw. Room introduced a separate 4th year Honours in mathematics. The sole recipient of 1st class Honours in 1935 was Alf Pollard, who was to become one of the most colourful and influential figures in Australian statistics, with career concluded by retirement from his position as Professor of Economic Statistics at Macquarie University. When Pollard retired, his department, incorporating actuarial studies, demography and statistics was split into two. The new Department of Actuarial Studies was headed by his son John Pollard, while the new Department

of Statistics was headed by Don McNeil. The account on pp.291-294 of the Pollard family's statistical careers, partly from Alf Pollard's private autobiography, makes fascinating reading.

Room's 4th year Honours class of 1936 included Pat Moran. Harry Mulhall, with first class Honours in mathematics and chemistry and university medal in mathematics, had also been instructed by both Carslaw and Room. He joined the Sydney department in 1941, and took over from Sawkins the task of teaching statistics in 1946. His Ph.D. was from Cambridge, where mathematical statistics as a discipline was evolving under John Wishart. Mulhall transferred to the newly created Department of Mathematical Statistics in 1959, and retired in the same year, 1978, as Oliver Lancaster. In the first full year of existence of that department, 1960, the 4th year students included Chris Heyde, Murray Aitkin and M.A.(David) Hamdan. Chris Heyde's illustrious career within Australia has encompassed the CSIRO, and accession to Chairs at the University of Melbourne and the A.N.U.

In regard to statistics at the University of Sydney in Chapter 6, which completes the story of the six state universities, one in each capital city, the career and activities of Oliver Lancaster naturally dominate. A meeting on 25 September 1947 between Lancaster, Stewart Rutherford and Helen Newton Turner was the genesis of the formation of the Statistical Society of New South Wales, the predecessor of the Statistical Society of Australia. Rutherford would go on to become Professor of Economic Statistics from 1962 to 1980. Other notable names associated with the early period of statistics at the university are Ann Eyland, Geoff Eagleson, and David B. Duncan, who had taught Biometry since 1938, and had returned by 1947 with a Ph.D. from Iowa State University, one of the great centres of statistics development in the U.S. The mathematics Honours class of 1958 included John A. Hartigan.

The Departments of Pure Mathematics, Applied Mathematics and Mathematical Statistics were incorporated into a School of Mathematics and Statistics from 1st January 1990, to achieve, it was said, economies of scale. The Department of Economic Statistics, under Aln Woodland, eventually underwent a name change to Department of Econometrics,

and then was incorporated into a larger Economics framework.

Maurice Belz, born and educated in Sydney, gained a B.Sc. from Sydney in 1918. He won a University Medal in mathematics, and a few years later was awarded a Barker graduate scholarship which saw him enter Gonville and Caius College, Cambridge. With an M.Sc. from there he was appointed to the University of Melbourne in 1923, and in 1929 he introduced a course in the theory of statistics. As Associate Professor there, Belz was appointed Head of the first autonomous Statistics Department in Australia in 1948. He was Professor of Statistics from 1955 to 1963, the first to hold such a position in Australia. The Australian statistician, Herbert A. David, born in Berlin in 1925, and as a postwar student at the University of Sydney, a contemporary of Oliver Lancaster (after Lancaster's military service as pathologist in New Guinea), was appointed Senior Lecturer in Belz's department in 1955. He left in 1957 to pursue an illustrious career in the U.S., and is still active in the history of statistics. Other staff at the University of Melbourne during Belz's time included Joe Gani, Geof Watson, Rupert Leslie, Emeric Binet, Alison Doig (who later worked with M. G. Kendall on statistical bibliography), Betty Laby (apparently not mentioned in the book), Daryl Daley, Peter Finch, Stephan Maritz, Warren Ewens, and C.R. (Chip) Heathcote. Both of the last two were in Ted Hannan's Statistics Department when I arrived there.

After retirement, Maurice Belz was replaced as Professor of Statistics in 1964, by Evan Williams, who took the position in preference to an offer of a personal Chair at the University of Tasmania, his alma mater. The staff members which Williams inherited from Belz were Finch, later Professor of Mathematical Statistics at Monash University, and Maritz, who was to hold Chairs at both Monash and Latrobe. Williams retired in 1982.

On Bragg's suggestion John R. Wilton, who had spent his early years at Mount Barker, near Adelaide, after his Honours degree in mathematics and Physics there, entered Trinity College, Cambridge. After a lectureship in mathematics at Manchester under Horace Lamb, within a year he was offered the Chair in Adelaide. He reorganized the mathematics courses, and was very influential in changes to school mathematics in South Australia. (I still have my copy of the 1957 version (it was first published in 1941) of

H.M. Searle and A.W. Jones: *Leaving Mathematics (Revised) with Answers*. It has a preface by Wilton, who died of a stroke in 1944.) Harold W. Sanders, an applied mathematician who had been at Adelaide University since 1923 replaced Wilton, who had been ill for a decade, as Elder Professor in 1944. A boost for Adelaide mathematics, and relief for its hard-pressed small mathematical staff, came with the appointment of Hans Schwerdtfeger in 1940. Though not a Jew, he had fled Naziism, and came to Australia through the intercession of Sir William Bragg. Schwerdtfeger "left a remarkable legacy in Adelaide. He had enticed Tim Wall away from medicine, Ren Potts away from engineering and Alan James ... away from physics".

Alan James succeeded Alf Cornish in the Chair of Statistics, in 1965 and retired in 1989. South Australian-born, his return from the U.S., as that of Rainer Radok, was due to Ren Potts. James' Ph.D., from Princeton, had been supervised by S.S. Wilks, a pioneer of mathematical statistics in that country. There is a feisty "Valedictory Address" in 3 parts by Alan James in the *SSAI Newsletter* (No.51, 31 May, 1990; No.52, 31 August 1990; No. 53, 30 November, 1990).

Due to Schwerdtfeger's influence, Sanders was able to argue successfully that he himself be replaced (as happened in 1948) by a Hungarian Jewish refugee living in Shanghai, George Szekeres, who had enormous influence on Australian mathematics, and on this reviewer personally as a fellow refugee. In a mathematical sense, the influence came later, through Szekeres' work on iteration, when I was working on the simple branching process, which is essentially a problem in iteration in a stochastic model framework. This wiry man of modest physical stature bestrides the latter parts of this book. George and his wife Esther both died in Adelaide within hours of each other on 28th August, 2005. In Sydney they had lived in Turrumurra, and liked to have coffee at a local pastry shop where I occasionally met with them. George collaborated in some work in probability with Emeric Binet; and perhaps with the Szekeres' friends from their youth, Alfred Renyi and Paul Erdős, two great Hungarian names of probability, who came to Australia on visits.

The second Professor of Mathematics and Physics at the University of Queensland (founded in 1912), Eugene Francis Simonds, appointed in 1932, had already been in the department for some

years. Australian-born and educated, unusually for the times he studied in New York, gaining a Ph.D. from Columbia University. He introduced new courses in statistics and actuarial mathematics; his research output demonstrated a growing interest in statistics. He retired in 1955. Later names of importance to Australian statistical history include those of Henry Finucan, and Stephen Lipton, the foundation Professor of Statistics from 1967 to 1991.

The University of Western Australia was founded in 1913. Weatherburn, was the second Professor there. Born in Chippendale, Sydney, and educated at Sydney Boys High and the University of Sydney, he was a B.A. with first class Honours from Trinity College, Cambridge. He retired in 1950. Other statistical names associated with this university are those of Joe Gani, Uma Prabhu and from 1974, Terry Speed. Some temporally intermediate names are missing from the author's account, specifically Don McNeil.

Statistics at the University of Tasmania, in addition to Pitman, includes in its development Peter Sprent, Don McNeil, Michael Hasofer, Peter Sprent, and L.S. Goddard.

Chapter 6 also describes mathematics in what were to be called The University of New South Wales and the University of New England. With the Australian National University, there were nine universities and two university colleges (in Newcastle and Wollongong) before the changes brought about by the report of the Murray Committee in 1957. Chapter 7 includes a treatment of the Australian National University. Important statistical sources for the author of this book were *A Brief History of the Department of Statistics. The University of New South Wales. 1948-1983.* by J.B. (Jim) Douglas which appeared in 1996; and Joe Gani's *Fifty Years of Statistics at the Australian National University, 1952-2002*, published in *HRAS* in 2005. (A history of statistics at the University of Sydney is envisaged for 2009, the 50th anniversary of the creation its Department of Mathematical Statistics.)

The dominant influence in the development of statistics, in British sense of including applied probability, in Australia was the Department of Statistics in the Research School of Social Sciences, ANU, at which Pat Moran took up the Chair in 1951. In what was an

continued on page 12

Counting Australia In

From page 11

Australian tradition by the time, Moran and Freddie Chong (later Professor of Mathematics at Macquarie University) who had known each other at Sydney University, had both entered St. John's College, Cambridge. One of the effects which the newly established research-only ANU was intended to have, was to train and retain in Australia, Ph.D. candidates. In regard to statistics, the plan succeeded brilliantly. Eminent overseas and local staff were attracted to the department, as well as students not only from Australia and New Zealand. By the 1980's most of the Statistics Chairs in Australia had been filled by ANU's Ph.D. graduates. The story is well told in Joe Gani's article, and is well told in Cohen's book.

Joe Gani has been activist in the development, status and health of Australian mathematics since his early years in this country, and the author's Preface lists him among those who provided exceptional assistance. Since Gani's return to Australia in 1974 (to the CSIRO) and in 1994, he has been enormously influential in Australian statistics, and in his formal retirement remains active and energetic at ANU.

With the great increase in the number of universities and appointments from 1960, emphasis in the book relating to this period is on Professors and dominant personalities. The author in this part of the book also tends to emphasis on Australian activity and qualifications in U.S. universities. There is consequently some unevenness of treatment of statisticians, for example Iain Johnstone and Barry Quinn, classmates at ANU.

Recent Topics and Concluding Remarks

The book's author uses the Mathematics Department of the University of New South Wales as platform for his main discussion of financial mathematics in a concluding section of Chapter 6. The beginnings of this largely probability-based subject area in Sydney were probably in joint work stretching over the 1980's, at the University of Sydney between Dilip Madan and the reviewer, whose collaboration culminated in the foundation paper on the now widely cited and used Variance-Gamma Model for the movement of returns, which was

published in *J. Business* in 1990. Dilip, at the time a member of the Economic Statistics/Econometrics Department, has subsequently gone onto great things at the University of Maryland at College Park, and as consultant to many financial institutions, in the U.S. and Europe, including Morgan Stanley on Wall Street.

Another interesting area, conservationism, is treated very briefly on p.286, in the context of Flinders University, and includes the names of Keith Tognetti in Wollongong, Shirley Strickland de la Hunty (recently deceased) in Perth, and most remarkably, John Walmsley. There is more to tell of Walmsley's interaction at Flinders with Rainer Radok, and of Radok's interesting career in Australia.

Certain important topics for mathematics as broadly defined in this book are close to the author's heart, and are particularly well treated. The Canberra CAE/University of Canberra is used as a platform for the Australian Mathematics Trust and the Australian Mathematics Competition. The Australian Academy of Science is used as background for the 120 page report dated January 1996: *Mathematical Sciences: Adding to Australia*.

This report was motivated largely by the parlous state of mathematical sciences, particularly in the newer universities such as Wollongong, Newcastle and Monash, resulting from the announcement in December 1987, which ended the binary system of universities and Colleges of Advanced Education (the "Dawkins reforms"), and the introduction of HECS. This is described in Chapter 9. By 1999 there were, consequently, 37 public universities across Australia, all competing for government funds for both teaching and research. The number of Professors of Mathematics, including mathematical statistics, at Monash peaked at nine in the late 1970's. At the end of 2005 in its School of Mathematical Sciences there were five. At the CAE's which had become universities with the end of the binary system, the decline of mathematics, included in Chapter 7, though on a smaller scale, is no less dramatic.

In regard to statistical sciences, to the sources cited by the author one might add the following: P. Groenewegen and B. McFarlane (1990): *A History of Australian Economic Thought* (pp.92-117);

and the papers originating from Invited Paper Meeting 75: "Statistics in Australia Growth and Influence" on Thursday 7th April 2005 of the Sydney Session of the International Statistical Institute which are available on the post-session CD of presentations produced by the ABS. The papers particularly relevant to Chapter are: Ian Castles (formerly Commonwealth Statistician): "Official Statistics: From Blue Books to White Papers"; and Murray Cameron (Chief, CSIRO Mathematical and Information Sciences): "Statistical Research for Science and Industry."

The following criticisms can be easily eliminated with any updating of this important book.

Ease of use of the citation system seems to me of paramount importance in such a reference book. In this one citations are by sequential number of endnote. The numbering begins anew for each chapter. At the end of the book the endnotes are listed under chapter number, but the text pages on which the numbers occur have at the bottom of each page only the chapter title. Thus one needs to go to the table of contents (or to flip back) to the chapter's beginning, to find the chapter number, before being able to access the endnotes.

There is no bibliography: that is, no overall alphabetical listing by author of all the items cited in the book, so it is difficult to see, for a given author/editor, which items have been used. Of particular interest to this reviewer was citation of writings of historical kind of H.O. Lancaster, J.M. Gani, I.S. Turner, R. B. Potts and C. Forster. However, for example, it's somewhat difficult to see if Gani's *The Making of Statisticians* is cited.

The Name Index could have been more comprehensive. For example, apart from names which occur in the text (such as A.G. Pakes on p.201) but are missing completely from the index, the names of J.N. Darroch and D.R. McNeil occur on pages (resp. p. 297 and p.301) additional to those listed in this index.

However, I leave this book with profound admiration for both its author and his creation, and encourage its wide dissemination among individuals as well as libraries.

Eugene Seneta
University of Sydney

Branch Reports

QUEENSLAND BRANCH NEWS

At the Branch's October ordinary general meeting, Tim Robinson from the University of Wyoming presented a seminar titled "*Bayesian Analysis of Split-Plot Experiments with Non-Normal Responses for Evaluating Non-Standard Performance Criteria.*"

Tim began his presentation by explaining an example of the use of split-plot experiments in the production of light-polarizing film used in the manufacture of items such as sunglasses. The inputs to the process that could be controlled were chemical components or mix and process settings. The response is the quality of polarized light that passes through the film. The distribution of the response exhibited a constant coefficient of variation suggesting a gamma distributed variable. For each combination of input mixtures, the process variables were altered according to a 2ⁿ factorial design, hence the use of the term "split-plot" to describe the design. The whole plot stratum corresponded to a "roll" of film and its precision was modelled as a random variable.

Tim then used a Bayesian approach by defining a prior distribution for the parameters that controlled the quality of the film. The "whole plot" effect distribution was defined as normal and the response was distributed as gamma conditional on the whole plot effect. Tim proceeded to fit the model using WinBUGS comparing the output generated with that from a PQL approach. The two sets of parameter estimates were similar.

The analysis became more complex when the response changed to the number of film pieces in a roll that exceeded a predefined stringent specification. The benefit of a Bayesian approach was then realized when Tim could generate point estimates and credible intervals for this parameter.

The speaker and members adjourned to a local restaurant for further discussions.

WESTERN AUSTRALIA BRANCH NEWS

August Meeting

The talk presented at the August meeting of the WA branch was titled "Robust Methods for Fitting Gamma Distributions with an Application to Spectral Goodness of Fit Data, For Use in Chemometric Measurement Quality Assurance". The speakers were: the SSAI WA branch

president Brenton Clarke; a former honours student of Brenton's at Murdoch University, Peter McKinnon; and Geoff Riley of Alcoa World Alumina.

In order to estimate the size, location and grade of bauxite deposits, Alcoa must process approximately 500,000 drill samples annually. The solids analysis technique of infrared spectroscopy is used along with fast Fourier transform spectral analysis to extract chemical information from the samples.

The spectra are approximated using partial least squares or principal components regression and the fitted models are assessed using the representation indicators Mahalanobis distance and residual ratio. These representation indicators have an approximate gamma distribution and robust methods of estimating the shape and scale parameters of this distribution are required.

The study evaluated several estimation methods: maximum likelihood, method of moments, L2 minimum distance, Cramér von Mises distance, and Hampel's B-optimal. Robust methods such as the B-optimal estimator perform well in practice, particularly in the presence of outliers, however they are difficult to compute since their "tuning parameters" require knowledge of the underlying parameter. Neither the method of maximum likelihood nor the method of moments are robust for the gamma parametric family since they have unbounded influence functions. On the other hand the two estimators, the L2 minimum distance and the Cramér von Mises distance estimator, are robust in terms of having bounded influence functions and perform reasonably well in terms of efficiency. Asymptotic theory associated with these two estimators is justified using Fréchet differentiability. The Cramér von Mises distance estimator is the most readily computable, which is important where fast throughput methods are needed.

The question was asked about whether multivariate methods could be used to identify outliers prior to the summary data involving variables with approximate gamma distributions. It was pointed out that usually identification of outliers in multivariate data involved computer intensive algorithms and this was not always amenable in an automated process.

Alex Stuckey

October Meeting

John Henstridge, Managing Director and Principal Consultant Statistician of Australia's largest fully commercial statistical and mathematical consultancy, Data Analysis

Australia, presented a talk on *Statistical Consulting – Beyond a Statistical Toolkit* at the October meeting of the WA Branch. John had recently presented this talk at the International Symposium on Business and Industrial Statistics in the Azores, and, indeed, he commenced his presentation to the WA Branch by recommending to us that if we ever got the opportunity to attend and present a paper at a conference in the Azores, that we should definitely take up the offer!

John began his talk by describing how a typical statistical consulting model would not be viable for a fully commercial company such as Data Analysis Australia. The role of the statistician in the typical model is limited, with their main input being only at the start (formalising hypotheses and defining data requirements) and the end (analysing data in terms of hypotheses and discussing the results) of projects or research with limited involvement in any other areas.

In reality, the commercial statistician's role is much larger than this. In a group of professionals, the statistician is at the very least an equal and often the appropriate leader for the project or research, rather than as just the technical advisor in a limited capacity. In this role, the statistician is involved in helping to define the client's problem, reviewing possible new and existing data, managing the data, analysis and presentation of the results. Typically, these results must be taken beyond the statistical results and formulated into real actions and recommendations for the client.

John summarised the differences between scientific and commercial consulting models in the following way – scientific consulting is typically more conservative, based on existing hypotheses, is often less time and cost critical and the statistician's role is clearly understood, whereas commercial consulting tends to be more optimistic, with innovative approaches favoured, is extremely cost and time critical and the statistician's role is much larger and less defined. In reality, some elements of each are often applicable to most cases, with some problems being closer to one model than the other.

The implication of this is that statisticians in commercial consulting need more than just good statistical skills. Having the statistical skills is necessary, but not sufficient, to be a good statistical consultant. The real skill lies in choosing the best tools to fit the problem, and in order to choose the best tool, you need to know the tools – what tools exist, what they might do, and perhaps, how to use them. It is unlikely that there will be

any tool that is exactly right, but knowing the tools allows a choice to be made as to what is *closest to right*. What is needed for this is a broad appreciation of statistical and mathematical principles, rather than simply the application of the details. Typically, this requires *more* knowledge, not less.

Anna Munday

CANBERRA BRANCH NEWS

August Meeting

The speaker at the Canberra Branch August meeting was Dr. Alison Smith from NSW Department of Primary Industries. On the occasion, Alison talked about her proposed approaches for detecting outliers in linear mixed models. She started her talk by giving a brief overview of mixed models. She then presented three practical examples from multi-phase trials of wheat varieties, a microarray experiment and nicotine content in tobacco, where the presence of outliers is suspected even after clustering effects and the effects of other covariates are accounted for using linear mixed models. Unlike ordinary linear models, where the existence of an outlier can be easily checked by looking at the residual plot, outlier detection in linear mixed models is more complicated. There are two factors that complicate outlier detection in linear mixed models, namely the existence of multiple random terms rather than a single random (error) term and the possibility of correlated rather than independent effects. She proposed to tackle this difficulty by extending outlier models discussed by Cook, Holsuh and Weisberg (1982) for ordinary linear models, where outliers are assumed to arise from an error term with inflated variance. In order to detect an outlier a score test based on the fit of the null (no outlier) model is proposed. The distribution of the score test statistic is approximated using a 'quick' resampling scheme or full bootstrap approach. In terms of yielding the correct level of Type I error, the 'quick' resampling method seems to be reliable, except when sample size is small in which case full bootstrap approach is preferred. The applicability of the score tests was demonstrated by applying them to the illustrative datasets. Some data points were identified as outliers and many were subsequently found to correspond to erroneous data. After the talk, there was a lot of discussion between the speaker and audiences on comparing her approach to potential alternative approaches such as modeling the outliers using distribution with heavier tail than Normal distribution

and extending the work to detection of multiple 'clumped' outliers. The moderator and the audience then thanked the speaker for sharing her interesting and important work. The evening was finished with members of the audience joining the speaker for a delicious dinner at an Indian restaurant nearby.

Dr. Alison Smith holds a PhD degree in Statistics from the University of Adelaide. In fact, as she told the audience, she holds the distinction of being the last student to be conferred a PhD degree before the Statistics department was amalgamated. She can be contacted at alison.smith@dpi.nsw.gov.au.

Canberra September Young Statistician Night

On September 25, the Canberra branch organized a special meeting for Young Statisticians. The meeting was an avenue for young statisticians in Canberra and nearby regions to meet each other and exchange ideas and networking. The event was very successful and 46 people came to the meeting. On the occasion, we are very fortunate to have two promising young statisticians speak about their young career and achievement. Emma Lawrence from the Bureau of Rural Sciences (BRS) talked about her recent work which shows how statistics is applied to help answering questions of high importance to public policy makers. She highlighted her experience in using environmental data to predict the potential distribution of marine pests such as starfish in different locations around the country should an invasion event by these species occur. Another highlight was her project on predicting the effect of over fishing on the stock of commercial fish such as blue tuna.

The second speaker was Jessica Zhang from Australian Institute of Health and Welfare (AIHW). Jessica shared her long, winding story in becoming a statistician. From interest in mathematics during her secondary school years she did a degree in Economics and as a top student was offered a place at an American university to do a Masters degree. But her failure to obtain a US visa and the fact that her husband got a job in Australia led her to Canberra. Once in Australia, she decided to do a Masters degree in Applied Statistics at the ANU because she heard about the shortage of statisticians in Australia! Upon graduation from the ANU she was offered a job with AIHW. She said that in statistics she has finally found her real interest and she is

enjoying her current roles as a data analyst and statistician.

After the talks, audiences were invited to a free Turkish pizza dinner. Exchange of experience and networking among all present continued during the dinner. The branch would like to thank Centre for Mental Health Research and School of Finance and Applied Statistics, ANU for their financial contribution to the event and Kevin Wang for organizing the event.

Angus Salim

Young Statisticians' Events in Canberra

This year has seen a considerable amount of young statisticians' activity here in the National Capital. Besides the Young Statisticians' Conference held in April this year, we had a Young Statisticians' Dinner in August and a Young Statisticians' Night in September.

The Young Statisticians' Dinner was kindly sponsored by the Canberra Branch and was held Thursday 16 August at UniPub in Civic (downtown Canberra). There were 14 attendees, most of whom were from the ANU. UniPub's pleasant atmosphere and "cook-your-own-steak" set-up (an interesting concept to some of us!) proved conducive to social mingling as everyone moved around to meet new people and chat.

We would like to thank Professor Michael Martin and Mr Ian McDermid for allowing us to talk to their classes and for promoting SSAI on WebCT (the ANU web-based learning system). Going to the classes and speaking to the students proved to be fruitful in promoting the Society and the dinner - most of people who came along said something along the lines of, 'I heard about the Society and dinner from the talk you gave us at the beginning of the semester!'

The Young Statisticians' Night was held on Tuesday 25 September. It was held as the regular Canberra Branch meeting. With 40 people attending, there is no doubt that this was one of the most successful young statisticians' events held by the Canberra Branch. Roughly 2/3 of the attendees were young statisticians and the majority were fresh faces.

Emma Lawrence and Jessica Zhang were the two young statisticians invited to give talks. Both speakers gave very interesting talks that were well received. Angus Salim's column provides details of their talks.

We would like to give special thanks to the Centre for Mental Health Research

and the School of Finance and Applied Statistics at the ANU for sponsoring us a wonderful Turkish Dinner after the talks, and Burgmann College (ANU) for providing us the venue. Indeed, the food was so good that there were sightings of random College residents popping into the room and nicking off with food! The collegiate environment was very fitting for the atmosphere of the evening and the stand-up dinner format allowed everyone to mix readily rather than being confined to a seat. Senior statisticians shared their experiences in informal chats and were invaluable to the young statisticians.

*Kevin Wang
ACT Young Statisticians' Representative
Richard Hutchinson
Co-Chair Young Statisticians Section*

SOUTH AUSTRALIA BRANCH NEWS

The use of High-Density Genetic Markers to Detect Genes Associated with a Disease

Huwaida Rabie, a Post Doctoral Fellow working with Dr. Ian Saunders at CSIRO, spoke at the September meeting about her current project which aims to develop methods for association and variable selection on SNPs data.

SNPs or single nucleotide polymorphisms are DNA sequence variations that occur when a single nucleotide within the gene is altered. These could be used to locate genes associated with a disease of interest. Only a small fraction of SNPs alter gene function or expression. The aim is to look for SNPs close to the disease susceptibility gene using an association study which considers the population and compares cases with controls. This differs from a linkage study which involves families. The issue of multiple testing is a huge problem in association studies where a large number of SNPs are considered.

Huwaida presented findings from a simulation study to compare methods of identifying SNPs associated with the disease susceptibility gene. The example data set related to leukaemia and involved consideration of both genotype and haplotype based data. The purpose of the simulations was to examine the accuracy of predictions and the ability to select the correct model. No evidence of an association between SNPs and disease was observed in the data.

Lisa Yelland

The South Australian Branch held another successful careers evening for Young Statisticians in September. The concept of a careers evening for students and those early in their statistical career was initiated by our Young Stats reps, Lisa Yelland and Penny Bennett, last year which generated a record attendance.

We had four speakers from different backgrounds to give a broad perspective on the potential careers for a statistician, particularly focused in SA. Our four speakers were: Ewa Seidel, Methodologist, ABS; Jonathan Tuke, PhD student and Lecturer at The University of Adelaide; Penny Bennett, PhD student and Statistician at Telstra; and Lynne Giles, Senior Research Fellow, Department of Rehabilitation and Aged Care, Flinders University.

To summarise, the speakers noted some different aspects of working in different types of organisations which are worth considering when thinking about taking a position:

- flexible working conditions
- freedom to research statistical topics for your own interest (academia might be for you)
- professional development: do they provide in house training? Do they support going to conferences?
- Will you be working with other statisticians? If not, maybe you will need to "network" with other statisticians outside your workplace to bounce ideas
- Good written and verbal communication skills are essential for communicating statistical concepts to non-statistical colleagues/clients
- Diversity of statistical projects: consulting provides this diversity - you get to play in everyone else's backyard for a while. Be a medical scientist one day, a horticulturalist the next

Other tidbits of advice that the speakers imparted to the audience were:

- Keep your uni notes, they may come in handy!
- Networking amongst statisticians is invaluable
- Do not underestimate your numerical skills and how they can assist others
- Honours and PhDs are worthwhile, they are an apprenticeship in research
- Consider what drives you, what interests you
- Do not compare yourself to others.

The night finished off with the speakers and attendees joining for some great pizza and plenty of discussions about career opportunities in statistics. The SA Branch Council would like to thank Lisa Yelland and all her helpers for organising the event and to thank all the speakers for their great wisdom and enthusiasm, which made it a great evening.

Janine Jones

Cornish Lecture – Statistical Critique of the International Panel for Climate Change's work on Climate Change

The SA branch inaugurated a series of public lectures on statistical topics of broad interest in 2001. The lecture series has been named to commemorate Alf Cornish, a leading figure in the early years of the statistical profession in Adelaide. The lectures are held biennially and presented by eminent statisticians from around the world. The speaker at the 2007 Cornish lecture was former Australian Statistician, Mr Dennis Trewin. As a current member of the Australian State of the Environment Committee, Dennis was invited to give a statistician's perspective on recent climate change projections made by the International Panel for Climate Change



Speakers at YS careers night (L-R): Lynne Giles, Jonathan Tuke, Ewa Seidel, Penny Bennett; and organiser Lisa Yelland.

(IPCC). His presentation was based on an invited paper presented at the OECD World Forum. Around 100 SSAI members and other interested parties attended the lecture – a record attendance for an SA branch event!

Dennis believes that climate change is an important issue which needs to be addressed. In his talk, he recognised the importance of the work conducted by the IPCC and congratulated them for the transparency of their work which includes projections of future climate change based on a range of scenarios. This transparency however, has allowed people to criticise their work and a major concern is the lack of involvement of statistical experts. According to Dennis, there are statistical flaws in the climate change projections which could lead to overestimates of global warming.

The IPCC have considered six basic scenarios in their climate change projections, depending on technology, population growth and use of fossil fuels. The media typically report on scenarios resulting in higher estimates of climate change. Dennis pointed out that not all scenarios are equally likely and voiced his concerns about some of the assumptions made in the various scenarios considered by the IPCC, such as absolute convergence of economies.

Addressing climate change requires resources which need to be used efficiently and thus, it is important for policy decisions to be made based on appropriate estimates of climate change. Dennis would advise policy makers that policies should be focused on the more likely climate change scenarios presented by the IPCC, however it should be recognised that much uncertainty remains and thus, an adaptive approach may be best.

At the end of the lecture, Dennis was faced with many tough questions from members of the audience who were clearly passionate about the issue of climate change. He then enjoyed a well-deserved dinner at Jahz Café with around 20 society members and invited guests.

Lisa Yelland

NEW SOUTH WALES BRANCH NEWS

Doug Altman who is currently head of the Centre for Statistics in Medicine, University of Oxford recently visited Australia as an invited speaker to the third International Clinical Trials Symposium. Doug kindly agreed to speak to the Statistical Society

during his very short visit and in order to keep his commitments manageable the NSW Branch worked with the Australian Pharmaceutical Biostatistics Group (APBG) to hold a joint meeting. As a result of this collaboration the meeting was held in the very pleasant surroundings of the Pfizer auditorium, a venue that also allowed us to video conference in members of the Queensland Branch. On behalf of the SSAI I would like to give a very big thanks to Philippa Clark, Deputy Chair of the APBG and Senior Statistician for Pfizer's health outcomes group for suggesting and organising the venue. I would also like to take this opportunity to thank all the staff at Pfizer involved in the evening, including the security staff at the front gate who let us in and helped us park, the IT staff who assisted with the video conference link, Annabel Peeling, Pfizer Biometrics who collated all the registrations so we could pass through security and the catering staff within the function area of Pfizer.

The meeting was held on September 20. Doug shared his opinions and insight to the selective non-reporting of findings of randomised clinical trials and the subsequent impact on systematic reviews that are commonly undertaken in the medical field.

Seventy seven people attended the Sydney venue (16 from Pfizer and the rest being from a number of institutions including pharmaceutical companies, academia and government). Approximately 50% of the Sydney attendees were statisticians but all had an interest in data and obviously amalgamating data in order to assist decision making. Another dozen or so joined us via video conference from Brisbane.

Doug started by reminding us that non-publication of the findings of some trials has been recognised as a potential threat to the validity of meta-analysis and reviewed the evidence of bias from this activity. This practice is usually, and paradoxically, called

“publication bias”. The main thrust of his presentation was to go on and discuss the recent new evidence that demonstrates that the selective reporting of trial outcomes within published studies is an additional threat to validity. Doug called this “reporting bias”. Doug showed results of research where they were able to obtain whole protocols and publications and found that the trial reports could include preferentially those outcomes with statistically significant results and, in addition, analyses in publications may have differed in important ways from those specified in the trial protocol. For example, the primary endpoint in the protocol is no longer the primary endpoint in the publication. The research also identified something that we may all have come across when reading publications but probably not thought that much about – the analyses specified in the methods section are not the ones presented in the results section! This is obviously of concern but is possibly easier to remedy through the review process than the selective reporting of endpoints.

Doug explained the Cochrane Collaborations new “risk of bias” tool for identifying selective outcome reporting and acknowledged that it couldn't provide the total solution. He also provided some, what he called, partial solutions such as monitoring and regulation via ethics committees, data monitoring committees and funders, registration and publication of protocols, replication and availability of the raw data - each of these having their own challenges not least of which is who is going to fund and manage the solution(s)!

After Doug's very thought provoking talk about 20 attendees joined Doug at a local Chinese restaurant to continue discussions. I think that all in all it was a very successful evening and thanks again to everyone who attended and assisted.

*Caro Badcock
President NSW Branch SSAI*



Doug beginning his presentation.



Caro and Philippa waiting to catch Doug's attention!