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EDITORIAL

NEWSLETTER: THE FIRST EDITION

This is the first issue of the Statistical Society of Australia's *Newsletter*. It has been established by the Central Council on an experimental basis for one year, in response to a perceived need for a wider outlet for news and comment than that currently provided by the News and Notes section of the Society's *Journal*. If the *Newsletter* proves successful, then it is hoped to produce three issues annually, in April, July and October.

The editors welcome contributions in any areas of interest to members of the Society. We hope to publish in each issue one or two major articles, of about 1500-2000 words, on topics which will appeal to large numbers of readers; for example, important current national and international statistical programmes; problems currently being faced by statisticians; public matters of interest to the statistical profession, such as the main article in this issue; and descriptions of practical applications of statistical techniques.

A section in each issue will be devoted to branch notes, with particular emphasis on reports of the substance of the talks at branch meetings. One of the aims of the *Newsletter* is to help make members more aware of the full range of activities of the Society, and the Branch Notes section in each issue will be a concrete contribution to its fulfilment. Branch Secretaries will be glad to receive articles and forward them to the Editors, or of course material can be sent to us directly.

The *Newsletter* will also carry regular articles on Statistical Education; on Statistical Computing; notices of conferences; and notices of visitors to Australia in statistical areas. Items for any of these would be appreciated.

Letters to the editors will be encouraged, and we would particularly like to carry letters from practising statisticians outlining difficulties they face, to enable theoreticians to assist with solving such problems.

We are also interested in descriptions of research areas currently being investigated, and short articles describing recent developments in important fields in statistics. However, these must be essentially non-technical; research papers will be forwarded to the Editor of the *Journal* for his consideration.

Production costs are being kept to a minimum by the use of voluntary typing; by the donation by the Division of Mathematics and Statistics of CSIRO of computer time for typesetting; and by including the distribution of the *Newsletter* with the distribution of regular Branch notices.

It is also anticipated that the *Newsletter* will eventually offset costs by carrying a certain amount of advertising of, for example, statistical vacancies, calculators and statistical literature. The editors hope members who can help to bring the *Newsletter* and such sources of revenue together will do so.

If the need for the *Newsletter* does exist, we assume it will flourish. We hope that you find this first edition stimulating, that you will continue to read it and will want to contribute to it, and that it will play a part in making the Australian Statistical Society a more vital and interesting professional body for all its members.

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The views of contributors to this ***Newsletter*** *should not be attributed to the Australian Statistical Society.*

Statistical Society of Australia

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From the Acting Editor

This issue of the SSA Newsletter will be the last in the quarterly format. It is sad to see a part of the fabric of the Society disappear; however, the Society is convinced that the new monthly eNewsletter will be more effective and timely in meeting the communication needs of its members. The President of SSA has written elsewhere in this issue about the Newsletter and its Editors.

Chip Heathcote died on July 18th 2016, and a short obituary written by Alan Welch was circulated to SSA members. Eugene Seneta has written an extended obituary for Chip, which he has interwoven with a history of Statistics at the ANU and with some of Eugene's reminiscences of Chip and the ANU. It is published in full in this issue; we hope you enjoy reading it.

Doug Shaw
Acting Editor

This is a very special SSA Newsletter because it is the last quarterly issue. Since Dennis Trewin and Richard Tweedie set up the first Newsletter in 1977 many dedicated members of the Statistical Society have put in considerable effort in managing this important communication tool for the Society.

The list here shows the names of those who held the position of Newsletter Editor until the end of 2015. After having been SSA Newsletter editor from 1982 until 2001, Doug Shaw then took over as Acting Editor, never intending to make it a long-term role.

Due to the struggle to find new editors, and because of the introduction of the recent eNewsletter, it was decided to discontinue the quarterly SSA Newsletter after almost forty years.

Thank you to everyone who has contributed their time, expertise and writing skills. Thank you especially to the Editors, the Branch Newsletter contacts, the many, many authors of articles and the Society members who have supported this SSA icon over the years.

Scott Sisson
SSA President

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Further contact details for Society Secretaries and Section Chairs can be obtained by contacting the Society on (02) 6251 3647.

Member News

SSA member Penny Robinson was awarded the "Inspiration Award for Individual Achievement (Adult)" on 27 April 2017 at the Autism Spectrum Australia (Aspect) awards.

https://www.autismspectrum.org.au/news/congratulations-2017-recognition-award-recipients

Congratulations, Penny!

Events

WIMSIG Conference 2017: Celebration of Women in Australian Mathematical Sciences
24-26 September 2017, Adelaide

Developing Your Career to Thrive in a Data-rich, Technology-driven, Reproducible Research Environment
25 September 2017, Tweed Heads

Young Statisticians Conference 2017
26-27 September 2017, Tweed Heads

Joint International Society for Clinical Biostatistics and Australian Statistical Conference 2018
26-30 August 2018, Melbourne

To have your event added to this list, please forward the event details in the above format to eo@statsoc.org.au.

Christopher Robin Heathcote, 1931 – 2016, and Statistics at ANU

Chip Heathcote, as he was universally known, was born 18th April, 1931, in Secunderabad, India, and died 18th July, 2016, in Canberra Australia

The Australian National University (ANU), Canberra, founded in 1946 was designed to develop postgraduate training and research within Australia, and to attract to Australia eminent academics.

In January 1952 the first Professor of Statistics was appointed in the ANU's Research School of Social Sciences. This was an Australian, P.A.P (Pat) Moran. His main efforts were to be directed towards his personal research, which was basically theoretical statistics including probability theory and stochastic models, and the training of postgraduate students. His first two PhD students, from about 1953 to completion in 1955 were E.J. (Ted) Hannan and J. M. (Joe) Gani. Hannan was appointed the first Professor of Statistics, in the Canberra University College, taking up his position in 1960. The College became the ANU School of General Studies (SGS) on 30th September, 1960, when it was amalgamated with the original ANU to form the "new" ANU. The "old" ANU became the ANU Institute of Advanced Studies (IAS). There were thus two Departments of Statistics at ANU, Hannan's primarily undergraduate teaching department in the SGS, and Moran's research department in the IAS. Joe Gani (2005) has described the history of Statistics at ANU up to 2002 in some detail, and I am indebted to his important study, to which the present study is in part a complement. Gani (1994) and Seneta (2017) are respectively obituaries of Ted Hannan, and of Joe Gani who died a few weeks before Chip Heathcote

Chip Heathcote, a PhD from ANU, was appointed Senior Lecturer in Ted Hannan's fledgling department in 1962, and later became its Head when he was, with Deane Terrell, one of the two Professors who replaced Ted Hannan in 1971 when Ted moved to the IAS department.

Through successive incarnations of the SGS Department, Chip provided a leadership and paternal role in research, research mentoring, teaching and administration until his retirement in 1996 as Emeritus Professor. The history of the Department and people and work it produced is fleshed out within this extended obituary of Chip.

Chip's Early Life and Early Academia

Secunderabad was founded in 1806 as a British cantonment and developed directly under British rule until 1948. Chip's father, also Robin, was a military doctor. Chip came from a very devout Protestant family.

The oldest of three brothers, he was bookish and loved horses. As his parents moved, he lived in various places in what is now India and Pakistan. He recalls 9 December 1941, the day the Japanese sank the "Prince of Wales" and the "Repulse":

"I was aged 10 living in Karachi when news of the sinkings came through. The immediate reaction of my mother was to have the malis (gardeners) dig trenches in the garden. … it made my mother feel better. The bulk of the Army, including my father, was in Africa. …Karachi, being towards the western part of India was about as far from the Japanese as possible."

[From Chip's manuscript: "Twilight of the Raj: India in the Decade Before 15th August 1947."]

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Around the time of India's independence Chip's father tried to move the family to New Zealand, but the family settled, like many coming from British India, in Perth. In 1946 Chip had arrived in Melbourne at Carey Baptist Grammar School as a boarder. His sporting prowess in all the sports, and most specifically his excellence in cricket won him life membership of the MCG, which he renounced on moving to Perth, where he attended the Hale School 1947-1948. He excelled in tennis (Winning Tennis Squad in 1948), and in cricket, and was a member of the school's football teams. After leaving school he worked in the bush in W.A.

At school, apart from a nascent interest in probability associated with running horse betting, mathematics had not been one of his strengths. But he developed an interest, re-sat his "Leaving" exam in mathematics, and enrolled at the University of W.A. for a Bachelor of Arts, awarded in 1956. His foci were Mathematics and History, interests which he was to maintain throughout his life.

It was early days for mathematical statistics in Australia. M.H. Belz had founded the first Department of Statistics in Australia at the University of Melbourne in 1948: this provided undergraduate courses. C. E. Weatherburn (1946) had written one of the first textbooks to fill a need in the area. It was based on a course of sixty lectures on Statistical Mathematics at the University of W.A. The book may have provided some stimulus for the young Chip Heathcote, although when I mentioned it to him in the context of my Bicentenary article, Seneta (1988), he was dismissive of the book.

Chip had met his wife to be, Nina, then a University of Sydney student, at a student camp on the Wye River in Victoria in about 1953. They married in February, 1954 and in late 1955 moved to Melbourne to pursue further study. Warren Ewens,FAA, FRS remembers Chip as tutor in Belz's department, and Chip in his CV lists "non-tenured status" at the University of Melbourne 1956-1957, and a 1958 M.A. from that university.

Chip's early papers (the first was Heathcote & Moyal (1959) were in queueing theory, a vibrant topic in applied probability at the time, and were written in the course of his PhD, supervised by J.E. Moyal, in Pat Moran's Statistics Department in the IAS, ANU. The title was "Some aspects of the theory of queues", and the Ph.D. was conferred in 1960.

Chip's CV lists under "Previous Positions" the University of North Carolina at Chapel Hill, 1961-1962. In the 1960's and 1970's queueing theory was a thriving research area in what had come to be called "Applied Probability". A leader in queueing theory was W.L. ("Wally") Smith, who was then in the dynamic Statistics Department at Chapel Hill, and the Heathcotes established an ongoing friendship during their time there.

After his appointment at SGS, ANU, in 1962 as Senior Lecturer, there is a break in Chip's publication output till a clutch of papers in 1965, one of which relates back to his stay at Chapel Hill (Heathcote,1965). He records in his CV a Study Leave in 1966 at the University of Maryland. There he was in contact with Ryszard Syski, a Polish-American mathematician, who was to become one of the leading names of queueing theory. Chip's sojourn at the University of Maryland may have enabled him to complete his booklet (Heathcote, 1967). His publication activity in queueing theory continued till about 1969.

At the S.G.S., ANU, 1965-1970

I first met Chip and Nina at the end of January 1965, when I first arrived, newly married, in Canberra, to take up a 1-year appointment as Temporary Senior Tutor in the SGS Statistics Department, and to begin a PhD part-time in Pat Moran's IAS Department. At the time Ted Hannan was on leave, and Chip was Acting Head. The other staff in the department were Warren Ewens, John Morgan, Paul Winer, Deane Terrell (who had come from Adelaide in 1964), and Erika Frederiksdottir as Lecturers. Des Nicholls was a graduate student writing an M.Sc., supervised by Ted Hannan. Later in that year, Sleeba John, from the Indian Statistical Institute, was appointed Senior Lecturer. Ted was still away, and I remember Chip asking my opinion about a telegram from Sleeba John, which read "Latest offer expected..." The "expected" was meant to be "accepted".

In those early SGS years, the only research degree supervised in the Department was a Master's by thesis. Choong Kong (C.K.) Cheong, who had shared my 4 undergraduate years at the University of Adelaide, had come to ANU a year before me, to do an M.Sc. which was supervised by Chip. The thesis, dated 1965, was "The Application of Results in Fluctuation and Renewal Theory to Queueing Problems." In 1965 Chip was also supervising another M.Sc. student, Hock Aun Cheong (M.Sc., 1967), like C.K. Cheong from Malaysia (and who indeed, though no relation, had the same surname, Cheong). Unlike C.K.'s, there appears to have been no joint publication resulting from H.A.'s thesis, which was titled "Some Applications of the Saddlepoint Methods in Probability Theory."

C.K. Cheong remained at the ANU to do his Ph.D. in the IAS Department under the supervision of David Vere-Jones, who had also arrived in 1965. Don McNeil, who had arrived at the same time as I (we met in Pat Moran's office) was enrolled full-time for a Ph.D. in the IAS Department. C.K Cheong later occupied very senior positions with Singapore Airlines, and with a major Singapore-based bank, and was honoured by ANU.

I had come to Canberra after submitting an M.Sc., written under the supervision of John Darroch at the University of Adelaide, and had brought with me an interest in absorbing Markov chains in general, and the simple branching process in particular. Harris's (1963) now classic book, and photocopiers, had recently appeared, and I had read in the original Russian Kolmogorov's and Yaglom's foundational papers.

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Joe Gani's Journal of Applied Probability (JAP) had appeared in 1964. David Vere-Jones, who was to become my de-facto supervisor, was developing the theory for countably infinite non-negative matrices analogous to the Perron-Frobenius theory for finite ones, which was a basic tool for absorbing chains.

Chip took me under his wing immediately. Throughout his career it was characteristic of him to nurture new arrivals. He had a facility for quick academic and social rapport. His CV indicates that he had, even before my arrival, had an interest in simple branching processes, so we were very quickly collaborating on a joint paper, published in JAP in 1966. We had, however, been a little hasty in our excitement, and a correction note was published a year later. But the highlight of our collaboration was the paper Heathcote et al. (1967), where the three of us found minimal conditions for Kolmogorov's and Yaglom's results to hold in the subcritical case, and had the paper published in the premier Russian - based probability journal.

Chip, at the time an applied probabilist whose emphasis was stochastic processes (a common focus of ANU Ph.D.'s), held the book of William Feller, Vol. 1, in high esteem, and was excited by the imminent appearance of Vol. 2. It appeared as Feller (1966), and Chip, pipe characteristically in place, declared it "marvelous stuff". It was too difficult for me, to whom it seemed a book written to impress Feller's peers.

At the time of my arrival in Canberra, the SGS Statistics Department was located in one of the barracks at Childers St. These barracks, opposite the military drill hall building which is still there, housed temporarily various departments of the SGS. A year or so later, the Faculty of Economics and Commerce, to which the Statistics Department belonged, moved into the then-new Copland Building.

At Childers Street, we in Statistics shared a tea room with the Faculty of Law. Kep Enderby, later Attorney-General in the Whitlam Government, was an unmistakable presence. In the early years Chip smoked a pipe and was a keen skier. I remember him on crutches after one weekend. There was talk in the tea rooms, both Childers St and later Copland, of "Smiggins", and "Perisher". The Copland tea room was luxurious, with tea ladies and regular morning and afternoon tea times, so there was much opportunity for twice daily social interaction. The SGS mathematicians, from another building nearby, also came. One could learn much about what was happening at the Faculty, the university and the world.

Chip promoted social interaction through one or two wine-bottling sessions at his home. A barrel of wine was provided, and bottles and equipment supplied. Occasionally, the Department would go to the Canberra Rex on a late Friday afternoon, for drinks and billiards.

C.C. (Chris) Heyde, later FAA, joined the Department as Reader in September, 1968 (Seneta & Gani, 2009). Chip was Reader by this time.

The position of Econometrics and Operations Research within the SGS Department of Statistics, and of this Department within the Faculty of Economics had been issues for some time. Change was made feasible by Ted Hannan's moving to a second Chair of Statistics in Moran's IAS Department. A decision was made to advertise two Chairs in the continuing SGS department, one in Mathematical Statistics and one in Econometrics. Chip Heathcote was appointed to the first, and Deane Terrell to the second. Chip was first Head, from 1971, of a planned rotating Headship.

He had earlier been offered the Chair of Statistics at the University of NSW. He had declined probably because he did not want to leave Canberra, and possibly because he did not want to affect the chances of his great friend at that university, Jim Douglas.

At the S.G.S., ANU, 1971-1974

The Faculty of Economics then made the building-up of the Econometrics component of the Department a priority. Des Nicholls, who had been a part-time tutor 1969-1971 while on a PhD scholarship, with Ted Hannan as supervisor, was appointed Lecturer, and was joined over the next four years or so by Ray Byron, Adrian Pagan and Tom Valentine.

In 1971, R.A. (Ray) Jarvis was appointed Senior Lecturer in Computer Science within the Department, and Computer Science I was offered for the first time that year. Ray was soon joined by Peter N. Cressey as Lecturer. Computer Science stayed as a subdepartment of Statistics till 1976.

Chip was Editor of the Australian Journal of Statistics (AJS) 1971-1973, succeeding the Foundation Editor, H.O. Lancaster, (1959-1971). During this time he invited Chris Heyde to write Heyde (1972) for AJS, a ground-breaking paper, and one which Chris later regarded as a favourite.

Chip had become Dean, Faculty of Economics, in 1973. He was again Dean in 1978.

Chris Heyde succeeded Chip as Editor (1973-1978) of AJS, but left the department in 1974 to join the CSIRO Division of Mathematics and Statistics, of which Joe Gani had just become Chief. It was located just a short way from the Copland Building, in Hobart Place.

Chip's CV records two periods spent at the London School of Economics: 1969-70 and 1974. The first of these would have enabled Chip to finish his book (Heathcote, 1971), in which he records teaching in American and British, as well as Australian universities. The Preface says:

"The present text is meant for undergraduates beginning the study of mathematical statistics and probability after completing a full first year course on calculus and real variables. ...

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Material for a course of approximately thirty six lectures is contained in the unstarred sections of Chapters 1,3, 4 and 5. ... a few important and essential theorems from analysis and measure theory have been stated without proof ... An attempt has always been made to motivate these results ... . "

The real variable theory reflects an applied probabilist's inclination to non-negative random variables, as reflecting physical quantities, and consequently probability generating functions and Laplace transforms being the corresponding real-variable transforms, via expectations, of their probability distributions.

Chip's book at some remove reflects initially the static approach to mathematical statistics of Weatherburn (1964), but with Chip's own subsequent strong deviation to stochastic processes. It embodies his concern for good teaching, and for reading correctly the level of students' capabilities by a lecturer.

Chip taught at ANU, amongst other things, a one semester second-year course in probability. The "thirty six" lectures mentioned in the Preface of his 1971 book clearly relate to this, since 36 corresponds to 3 per week for 12 weeks: about the length of a semester's teaching time. The year 1974 saw entry into our second-year mathematical statistics courses of a cohort of National Undergraduate Scholars which included Iain Johnstone, Barry Quinn, Rosemary Karmel and Mark Ramsey. Chip at the time was enthusiastic about the Keller Plan of teaching, which enabled talented students to proceed at their own pace, but it was demanding on staff time because of its 1:1 contact nature of students and staff. Chip recognized this, and it was dropped within a year. Barry Quinn, Professor of Statistics at Macquarie University, recently showed me his (second) well-worn copy of Chip's book. Iain Johnstone has long been Professor in Statistics at Stanford University.

The book was published by George Allen and Unwin, London, a very well-known "literary" publisher, but not, hitherto, of technical, let alone mathematical, material. Chip, in persuading me to write a book on non-negative matrices for the same publisher, explained that someone senior at Allen and Unwin with whom he had come in contact (perhaps through his Study Leave at LSE, and his cultural interests), was seeking to broaden the output of this publisher. My book duly appeared as Seneta (1973). There is an acknowledgement dated 1972 to "the head of the Department of Statistics at the Australian National University, C.R. Heathcote, for providing moral, and arranging material, support ". The person at Allen and Unwin who was the idealistic driving force behind broadening their publishing direction died in the 1970's, and with him such plans. However, Chip's book was reissued in 2000 by Dover, New York. A second edition of my book was published in 1981 by Springer.

In his nurturing way, Chip thought that I was able to supervise my first 4th Year Honours project (nowadays called by students a "4th Year thesis") in 1971, when the only 4th Year Honours student was Kathy M. Kang. I gave her the task of sorting out from the standpoint of mathematical statistics the controversial topic: Path Analysis, and she did it brilliantly, under difficult conditions. Our joint paper was delayed until 1978.

Although the SGS Statistics Department was in the Faculty of Economics, its courses were also available to students in the Faculties of Arts and of Science. The first year courses were largely of a service nature, with differentiation between statistical and econometric directions. A number of undergraduate students were from the ABS, then housed in a building "just down the street" from the Childers Street barracks. Cadets or employees sought to complete a degree with one major in Statistics; and other students on completion of 4th Year Honours went into employment with the ABS, where at the time two of the leading statistical figures were Ken Foreman and Ken Brewer. Focus was on sample surveys (sampling from a finite population) and time series analysis of economic data. In my first year as Lecturer, in 1966, the only course I was asked to teach was Sample Surveys. (Both Ted Hannan and Chip, who was Head of Department "episodically 1971-1996" had a policy of giving maximum time for research.) Time series analysis was Ted Hannan's specialty, in which he had acquired world fame. Des Nicholls eventually taught time series analysis with great clarity, and motivated my introduction of such an undergraduate course at the University of Sydney.

From the late 1960's Chip was evolving a research interest in the empirical characteristic function (ECF) constructed on the basis of a random sample, as a sampling reflection of the characteristic function $\psi(t)$ which characterizes a probability distribution. If the underlying distribution is symmetric about the origin, the complex part of the characteristic function is zero for all t, so the complex part of the ECF can be used to test for such a null hypothesis in the manner $H_0 : \psi(t)=\psi(t_0)$, using a fixed $t=t_0$. The first of Chip's publications on the ECF is Heathcote (1972), received October 30, 1970. The idea of ECF was to pervade the work of Chip's students and his later collaborations. Some of the key ideas already appear in this paper, namely: testing for location of a symmetric distribution; the relationship of an ECF- based statistic with the Cramér-von Mises test for testing a specific form of distribution function: $H_0 : F(x) = F_0(x)$; and the idea of studying the long-tail structure of distributions with such a long-tail structure, but with a simple structure of the characteristic function (such as that of the symmetric stable law) through the ECF.

The first successor paper to Heathcote (1972) with a student was Heathcote & Pitman (1972), received 30 July, 1971. J.W. (Jim) Pitman, son of the great Australian mathematical statistician E.J.G. Pitman, was among the talented students who passed through the SGS Statistics Department., and went on to glittering careers in Statistics.

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At the S.G.S., ANU, 1975-1979

In June, 1975 Raymond (Ray) Chambers submitted his MSc (Statistics) thesis, written under Chip's supervision. Its title was A Linear Model with Stable Residuals, and it was about asymptotics when the residuals in a linear regression follow a symmetric stable law. Chip asked me (I expect he thought it was time) to be one of the two examiners. It was my first experience of examining a research thesis, although I had already supervised Malcolm Quine's Ph.D..

The two papers: Chambers & Heathcote (1975, 1978) were largely a product of work associated with the thesis, motivated by the fact that for distributions such as the symmetric stable, with a simple characteristic function, moment-based inference via the ECF was feasible. Their Biometrika paper, Chambers & Heathcote (1981), some years later, was a culmination inasmuch it pointed out that a loss function using the ECF could be constructed. Therefore estimation of location and scale parameters was possible, in rough analogy with simple linear least squares when the residual distribution had moments.

Ray Chambers was still with the ABS in the early 1980's. He was awarded a Commonwealth Public Service Scholarship Tenable Overseas in 1979, with very strong support from Ken Foreman, and went to Johns Hopkins University, Baltimore, where he completed a Ph.D. (1982) under the supervision of Richard Royall. The title was "Robust Finite Population Estimation". Ray writes:

"My research there was very much influenced by my training in outlier robust inference that I had received from Chip. … "

Chip and Ray Chambers were both "refugees" from the British Raj in India, which enhanced their academic closeness.

Peter Hall had come to ANU in December 1973, having completed his 4th Year Honours in the Department of Mathematical Statistics, University of Sydney, to explore possibilities of graduate work. He eventually began research in the SGS Department under Chris Heyde, and enrolled for an M.Sc., submitted two years later while he was in Oxford completing a D.Phil. under John Kingman, FRS. Peter returned to the Department as Lecturer, in 1978. Terry O'Neill, an Adelaide graduate and Stanford Ph.D. also joined in 1976, and with Peter Hall gave it a boost in research in mathematical statistics.

Closely following Chambers & Heathcote (1975) was the paper of Feigin & Heathcote (1976), with its title clearly describing one of the issues raised in Heathcote (1972). Paul Feigin's (Ph.D., 1975) thesis: "Maximum Likelihood Estimation for Stochastic Processes- A Martingale Approach", acknowledges both Chip Heathcote and Chris Heyde as supervisors, and Gani (2005) indicates joint IAS/SGS supervision.

Brenton Clarke (Ph.D., 1980) in an initial email to me of August 2016 mourns the passing of both his supervisors, Chip Heathcote and Peter Hall, within such a short space of time.

In a condolence email, of 4 August 2016 to Chip's daughter, Sarah, on Chip's passing, Brenton had written:

"I knew him … when he took me on to be a tutor in his department and then to do a PhD with him. We used to meet once a week to talk as he had a very busy schedule as Dean of the Faculty…. I remember getting frustrated because the PhD problem I had decided to work on was not giving me numerical values that made sense, even after one year, …it worked out well in the end as he took a long sabbatical from ANU … and came back to advise me well on what to leave out of my thesis, so that I could submit my doctorate. I was very appreciative of the PhD referees that your Dad had lined up for me while he was away. The problem that did not work out in the first year was solved and it became the last example chapter of my thesis. …in 1991 [I] worked with your Dad on a paper which extended the last chapter of my thesis …Your Dad was a kind man of conservative persuasion, a bit like my Dad in that respect. …I was only 21 when I started working with him. …."

Chip's Study Leave was at Mathematisch Zentrum, Amsterdam, 1979, and University of California, Berkeley, 1979-1980.

Brenton continues:

"Peter's contribution was to get me to look up results on limit theorems since he was doing his book on such with Chris Heyde. But Peter's greatest attribute was a positive attitude re research. I think we all benefitted from Chip's running of the department even though I was too young to appreciate that at the time."

The title of Brenton's PhD dissertation is "Robust Estimation: Limit Theorems and Their Applications". M-estimators, a generalization of maximum likelihood estimators, and robustness, all come within the ambit of approach of Chip's ECF interests.

Chambers & Heathcote (1981) was immediately followed, in the same volume of the same journal, by one with another of Chip's students, in a similar vein (Heathcote & Silvapulle (1981)). Mervin Silvapulle (PhD 1981) lists as his supervisors Chip Heathcote and Terry O'Neill. His thesis title was "The Minimum w2-Method of Estimation."

In the year 1981, the Hungarian mathematician Sandor Csörgö was a Visiting Fellow in the Department of Statistics, The Faculties, from 14 July to 18 September. Csörgö had been one of several authors interested in and publishing on the ECF. He may have been the referee for Chambers & Heathcote (1981), on which the invited paper Heathcote (1982), in a Special Issue honouring P.A.P Moran, focussed. Contact had been established and Chip had arranged the visit. It was spectacularly successful. The paper Csörgö & Heathcote (1982), received 30 October 1981, presents the estimation theory (free of its linear regression setting) of Chambers & Heathcote (1981) and Heathcote (1982) (at that time still to appear) within

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a context of a limiting Gaussian stochastic process, with a covariance matrix expressed in terms of the real and complex parts of a characteristic function, where "t" is a time parameter. The full highly technical detail is in the-then to appear Csörgö (1983).

I left the Department in mid-1979 as Reader (from 1974) to go to the University of Sydney as Professor and Head, Department of Mathematical Statistics. Alan Welsh was a student in my Sydney department at the time. He obtained First Class Honours, with University Medal in 1981.

The "School of General Studies" at ANU was renamed "The Faculties" from 1980.

Department of Statistics, The Faculties, ANU, 1980-1996

By 1980 Chip had given up smoking. His angina had become so severe that he could scarcely walk from the carpark to his ANU office. Given weeks to live, he had triple bypass heart surgery, it seems in 1981 when he was about 50, at Royal Prince Alfred Hospital, Sydney. It was early and anxious days for this kind of operation. After the operation Chip became an avid walker.

Alan Welsh (Ph.D., 1984) had arrived early in 1982 to begin his PhD. having intended to work with Chip on the ECF. In 1982 ANU was starting to have a supervisory panel of three for its PhD students. Alan's panel consisted of Chip, Des Nicholls and Peter Hall.

Chip, recovering from his triple bypass, used to come in in the mornings, and then go home to rest.

Alan's first paper, following on from ideas of the Chambers and Heathcote papers, was with Peter, on a test for normality. His first paper joint paper with Chip (Heathcote & Welsh, 1983) applying the Chambers and Heathcote regression ideas to a time series context, autoregression, which was Chip's initial proposal for a thesis topic, was next. The then still-to-appear, but preprint-available, paper of Csörgö (1983), played an important part in Alan's research.

In the Preface to his thesis "Some Problems in Adaptive Estimation") Alan writes: "... it is known that the tail behaviour of a distribution function is reflected in the behaviour of the characteristic function near the origin ...Here we will mainly concentrate on the empirical characteristic function approach ... "

There is a break in Chip's publication record between 1983 and 1987, perhaps related to his continuing recovery from his first triple by-pass operation. It then picks up in 1987, resuming his collaboration with Sandor Csörgö on symmetric distributions, and with Alan Welsh on functional least squares.

By 1982 the size of the Department had increased to thirteen (Gani, 2005), with Heathcote and Terrell as Professors.

In 1988 Peter Hall, through intensive efforts by Chip Heathcote, was appointed Professor. In "The Faculties" promotion to Professor at the time was a very rare event. From 1986 Peter spent half of each year at IAS, and was involved in the fledgling Centre for Mathematical Analysis. In 1991 he reverted to a full time appointment in The Faculties, with secondment to the Centre of Mathematics and its Applications.

Ray Chambers left the ABS in 1983, but stayed in the Australian Public Service (APS). In 1991 there was a Senior Lecturer position open in the SGS Statistics Department for which, at Chip's suggestion, he successfully applied as a straight transfer from APS. In 1995 there was an offer from

Southampton University, at the time building considerable strength in Statistics, and with Chip's blessing Ray made that jump. He is presently Professor of the University of Wollongong.

For the period mid-September, 1989 – 31 December 1989, there was an exchange between the Department and Joe Gani's department at the University of California, Santa Barbara, of Ross Cunningham and Joe Gani, with Joe titled Visiting Fellow at ANU, and agreeing to do some teaching. Then a further Visiting Fellowship, again "without grant", for 6 months from January, 1990; and similar for 12 months from 1st September, 1991. These visits were formally facilitated by Chip. Joe was at the time transiting to retirement amidst his old ANU friends, especially Ted Hannan and Chris Heyde, from Santa Barbara, where he was, in his last years there, spending only about 3 months each year. Subsequent requests for extension of Joe's Visiting Fellowships were taken up by Chris Heyde. Chip spent a period of Study Leave at Santa Barbara in 1992.

In 1992 the Mathematical Statistics group, headed by Heathcote as Professor, in the Department included D.F. Nicholls as Reader, and R.B. Cunningham, T.J. O'Neill, and A.H. Welsh as Senior Lecturers.

Late in 1987 the Head of Actuarial Studies at Macquarie University approached the Faculty of Economics and Commerce. The Department of Statistics was enthusiastic, and Chip and Des Nicholls designed a course for a B.Ec.in Actuarial Studies, in which Macquarie University would participate. The course proceeded successfully till 1992, when Macquarie University announced that it would no longer participate in 1993 and beyond. An arrangement was then made for the University of Melbourne to teach the actuarial units by videoconferencing. In 1996 ANU introduced an Honours programme in Actuarial Studies, and in 1999 the Faculty decided to run its own Actuarial Studies course.

In 1995 the Department was renamed the Department of Statistics and Econometrics, according to Gani (2005). By then Chip had been succeeded as Head.

In publications from 1988 to Chip's retirement in 1996 there is a decided turn to epidemiology: issues of disease,

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mortality, life expectancy, insurance, and in particular coronary heart disease.

Chip includes in his CV the following periods spent in France: INSERM, Montpellier, summer 1992; INED, Paris, winter 1995-1996. In an email dated 19 September, 2016, sent to iMaCh-users, and copied to Sarah Heathcote, Nicolas Brouard writes:

"During the early 90's Chip travelled to France ... He spent a semester at INED at our research unit

'Mortalité, santé, épidémiologie' and we worked on mortality in France as well as estimation of confidence intervals in interpolated Markov chains."

Brouard and his family visited Chip at ANU. Brouard says of Chip at this time that Chip couldn't be more happy, and remembers him as saying that if one has gardening at home and reading at the university, little more is needed in life. Brouard continues:

"For several years, he and his wife Nina spent springtime and early summer in Europe, flying back to the Southern Hemisphere to avoid cold time in Europe ... probably the best time to live on this Earth ... He is one of the main authors of our iMaCh software and articles related to it ..."

Some of Chip's contribution in this respect is encompassed in Lièvre et al. (2003).

His last paper published before his retirement is Heathcote et al. (1995).

Sarah Heathcote remembers, of some years before his retirement, Chip waking at 4am to work, and Chip taking 8am classes. These were first year classes, the good teaching of which

Chip regarded as very important. Alan Welsh took over these classes in 1994. He remembers Chip mentioning taking his dog for walks along Red Hill in the very early mornings.

Chip retired at the end of 1996. From January, 1997, he was Emeritus Professor and Visiting Fellow, Centre for Mathematics and its Applications, ANU.

Retirement

There is a publication gap until Chapters 3 and 4 of Heathcote and Higgins (2001a, 2001b).

These begin a sequence of papers which continue epidemiological themes of a decade or so before Chip's retirement. Notable is continuing collaboration with Terry O'Neill, Tim Higgins, Brett Davis, Borek Puza, and Steven Roberts, all but perhaps one members of what had been until 2001 called the Department of Statistics and Econometrics, when it was merged with the Department of Finance to form the School of Finance and Applied Statistics, with Terry O'Neill as its Head. According to Gani (2005), the School's staff in 2002 consisted of eighteen members, nine specializing in Statistics and Actuarial Studies, namely O'Neill and Nicholls as Professors, M.A. Martin as Reader, D. Pitt, D. A. Service and S.E. Stern as Senior Lecturers, T. Higgins and B. Puza as Lecturers, and Helen Johnson as Associate Lecturer.

In about 2006 it became the School of Finance, Actuarial Studies and Applied Statistics, and in about 2009 the Research School of Finance, Actuarial Studies and Applied Statistics. In 2016, "Applied" was dropped from the title.

The last of Chip's papers to appear was Heathcote et al. (2009). Thus he had been publishing over a period of 50 years.

Statistical issues in health science were only a part of his retirement activities. He indulged in many interests. His daughter Sarah told me about a new-found interest in pottery, and the University of the Third Age where he took courses on Kipling (a reconnection with his Anglo-Indian heritage) and on the Enlightenment.

There were two talks, of which he shared the materials with me, to the Probus Club of Canberra, in August 2010 and August 2012 respectively. These were historical with background connection to his own and Nina's background. Both bear the notation: "C.R. Heathcote, for the family." The respective titles are:

1. "Twilight of the Raj: India in the Decade Before 15 August 1947."

2. "First Shots in the Cold War: The Warsaw Uprising of 1 August 1944."

Sarah told me that Chip's political views, over his lifetime, had run the full spectrum, beginning with left-wing; and in the end were, according to Joe Gani, very conservative. In the last years of his life he pondered the purpose and meaning of human existence, in some intellectual sense and measure perhaps reconnecting to the religiosity of his childhood environment.

Reflections and Last Things

These notes are written to illuminate the background to the previous sections.

Chip and Nina's children, Robin and Sarah Heathcote, were born in 1961 and 1970 respectively. Chip has 4 grandchildren through Robin. Sarah left Canberra in 1995 to work in Geneva. She now continues the ANU connection as Associate Professor in Law.

John Besemeres and his wife Anna Wierzbicka, soon after their arrival from Warsaw early in 1973 to pursue academic careers at ANU, met the Heathcotes through Nina, who had developed a specialty in the politics of the European Community. and was a Research Fellow in the Political Science Department of the Research School of Social Sciences. This Department was housed in the Coombs Building, where Nina and John had offices close to each other.

John, an expert on political aspects of demographic developments in the Soviet Union and the communist countries of Europe, and a gifted linguist, continues in an email attachment of 15 August 2016:

"Though Chip had the gravitas of a professor, I remember finding him - despite his quiet characteristic

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reticence – very warm and communicative from the outset. … He seemed to read widely … I quickly realised that it was important to have a bottle of respectable whisky for a post-prandial … He also enjoyed a glass or two of red wine, and … in his last months … [I] took one of my better bottles to leave with him in memory of happier times.

One of the pleasures of my retirement was that I had more time to see Chip and Nina, and we would meet them sometimes for lunch. Chip by then had gone through his second bypass operation [about 2003], and while he made light of it, it was evident that he felt it had been less successful than the earlier one."

I (ES) used to visit Canberra about once a year to see old friends, and visits to ANU were always followed by a meeting of Joe Gani's informal coffee club. I never found Chip there, and so we drifted apart.

But before one of my visits to ANU, in 2011 or 2012, I told Joe that I would like to see Chip again. I was happy that he came, by car directly to the coffee house.

Nina died in 2012. Chip, Sarah and family organised a commemoration in their beautiful garden.

It was a mild sunny day, and Chip delivered a eulogy, after climbing onto a garden bench by way of an improvised podium.

After that Chip and I had an annual lunch in Canberra, four in all, always over wine, generally his own, generally in a favourite restaurant. He would arrive to pick me up from New Acton punctually at 12 midday, and had a walking frame in the car which he needed after arrival near the restaurant. He had another health issue developing at the time of the first two lunches, and I was advised not to delay my next visit for too long. But when next we met, medical or dental intervention had been successful, and he was quite cheerful. After the last of our lunches as we talked at Chip's home over wine, he was effusive over the electronic tablet which Sarah had got him.

He had a heart attack on 26 January 2016. Sarah Heathcote writes (7 Feb., 2017): "About a month later he fell and fractured his 'C2' disc, commonly known as a broken neck."

Joe Gani died on 12th April, 2016, and a Memorial Service for him was held on 22nd April in the Great Hall, University House, ANU (Seneta, 2017). At the refreshments following, I was told that Chip had been there, with the walking frame on which he had become reliant since Nina's death. He had looked very unwell, and Sarah had taken him home before I could see him. I spoke with him later that day, for the last time, by phone. As usual he made light of it, summarizing by saying that he had broken his neck, but that this was not as bad as it sounded. There would be no time to meet since Sarah was about to take him for a holiday.

Ray Chambers and his wife, Pat, visited Chip at home in Forrest in May of 2016. Ray writes in an email to me: "He was his usual gentle civilised self then, frail, but very determined to keep going."

Chip, like Nina, died in his sleep in their bedroom at their home. The official cause of Chip's death on 18 July, 2016 was heart attack. Whether the neck, which didn't heal, played a role is unclear. And so:

The tumult and the shouting dies –

The Captains and the Kings depart –

Recessional. Rudyard Kipling (1865–1936).

Eugene Seneta

Acknowledgements

My grateful thanks for memories, information and materials are due to Sarah Heathcote, John Besemeres, Ray Chambers, Des Nicholls, Brenton Clarke, and Alan Welsh.

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QLD Branch

SSA-QLD Career Pathways seminar

Left to Right: Ms Lee Jones, President of SSA-QLD branch; Ms Angela Emblen-Reeves and Ms Jo' Anne Langham, Australian Tax Office; Mr Chris Galvin, Queensland Health; Prof Gita Mishra, The University of Queensland; Ms Jeeva Kanesarajah, 2017 SSA-QLD Young Statistician Representative.

The SSA-QLD Career pathways seminar was held on the 1st of August 2017 with a record turnout of 50 early career statisticians from universities, industry and government agencies.

Ms Jo'Anne Langham and Ms Angela Emblen-Reeves spoke about their experiences as analysts and employers in the Australian Tax Office. The spoke about the "Smarter Data" initiative by the ATO, and the need of analyst to be able to translate key findings to suit a lay audience. "Numbers resonate with people who are making decisions" Ms Langham noted.

Mr Chris Galvin from Queensland Health spoke of his diverse background and being able to link his clinical background with his statistical work gave him a competitive edge in his career. He highlighted the importance of being able to meet work deadlines and being reliable as an important aspect government employees need for career progression.

Professor Gita Mishra from The University of Queensland discussed the importance of working with great people as a stepping stone during the course of her career. She highlighted the need for statisticians to develop content knowledge of their research area e.g. biology, epidemiology, beyond statistics alone. She emphasised learning as a life-long process, and the importance of statisticians in research to be first authors or senior authors for career progression as an academic statistician. She spoke of the rise of social media and how researchers need to use this to their advantage as a method for research translation, maximizing research impact, and to communicate the importance of the research to the broader public.

All presenters emphasised the importance of not only having subject knowledge but also the importance of interpersonal skills, the ability to write and speak well. There was robust discussions at the Q & A, followed by a networking session.

Jeeva Kanesarajah

VIC Branch

Victorian Branch July meeting: An actuary, a data scientist and a statistician walk into a bar...

Ever wondered what the difference is between an Actuary, a Data Scientist and a Statistician?

Actuaries do it until death, disability or withdrawal
Data scientists do it with models
Statisticians probably do it.

On July 27, the Victorian branch jointly hosted an event with Data Science Melbourne and the Actuary Institute, where a member from each profession (plus someone who identified as all three!) discussed what it is that they actually do. Amanda Aitken represented the actuaries, Gareth Dickenson the data scientists, and the Victorian Branch's very own Sandy Clarke represented the statisticians. In addition, Mika Alo talked about his work as an actuarial-data scientist-statistician. Through their entertaining and informative talks, each of the speakers gave an insight into how they ended up in their profession, what they enjoy about it, and what it is that they spend their days doing. Although these three careers may sometimes be thought of as being somewhat distinct, the message that we're far more similar than we are different came through strongly.

Jessica Kasza

SA Branch

South Australian SSA 28 June 2017 Meeting

Murthy Mittinty

DAGs, Counterfactuals and Data generation process

The speaker at the June 2017 meeting of the SA Branch was Murthy Mittinty from the School of Public Health, the University of Adelaide. His primary methodological research was to distinguish between association and causation in the health sciences and the study of the mechanisms by which causal effects arise. His talk "DAGs, counterfactuals and data generation process" was a piece of his current methodological research work. In his presentation, Murthy raised the point about longitudinal data which brings many challenges to modelling. He illustrated some of these challenges using directed acyclic graphs, and also presented some recent methods that have been proposed using counterfactuals theory to study such data generating mechanisms.

At the beginning of his talk, Murthy described the Directed Acyclic Graph (DAG) in detail with Simpson's paradox, local directed Markov properties, Global Markov properties and factorization of joint densities according to the structure of DAGs. Murthy also discussed the G-methods: the marginal structural models (MSM, G-formula), MSM-inverse probability treatment weights (MSM-IPTW) and the structural nested mean models (G-estimation) that have been suggested using counterfactuals theory. At the end of the DAG discussion, he illustrated with an example-DAG of a real world problem: the causal relationship between obesity and pre-eclampsia, highlighting the time dependent confounding using joint, marginal and conditional distributions. In conclusion, the DAG should be used cautiously, otherwise mistakes can be made and conclusions can be adversely affected, he said.

A dinner was held right after the meeting at an Indian Restaurant in Adelaide.

Shahid Ullah

From the Office

Things at the SSA Office are usually pretty quiet, but for the past few months it's been intense, with preparations for YSC2017, hosting several workshops and getting to the tender stage for the refurbishment of our website. Many meetings, usually by teleconference, are required for the day-to-day running of the Statistical Society, but as events like our Young Statisticians Conference approach, we're suddenly looking at weekly meetings, which certainly keeps me on my toes. Our teleconferences are always a good opportunity to get to know our members- even if it's just their voice.

As mentioned before tenders have gone out to about ten different website designers, asking for submissions of proposals for a new look for our website. At this stage we have received three proposals and I can already tell that the selection process will be very difficult indeed, because the different companies all have so much to offer. This is a very exciting time and I can't wait to see the final product. Hopefully we'll have a new website up and running within the first quarter of next year, but before this can happen a lot of people will be working awfully hard to make it all happen. We can only hope that our members will like what we will have in stall for them.

As new tasks are added to my list, there'll be one less for me in the future: writing a "From the Office" column for our quarterly newsletter. It's been sometimes challenging coming up with topics to write about, but at the same time I've liked the idea of being able to call myself a bit of a newsletter "columnist". I suppose if I miss this task terribly I can always take it up again for the eNewsletter.

Thank you to all the readers who have supported the SSA quarterly newsletter for so many years.

Marie-Louise Rankin
Executive Officer

SSA Job Board

Have you seen the SSA Job Board (http://careers.statsoc.org.au/) yet? It was added to our website just over three years ago and while it had a slow start, people have certainly caught on now. The Job Board currently has 87 registered employers and 172 registered job seekers. 52 resumes have been uploaded and can be viewed by potential employers.

Our Job Board has many helpful features, such as tips on how to prepare a resume, what NOT to include in your resume, how to prepare for your interview, how to advance your career and how to manage in a digital world (http://careers.statsoc.org.au/jobseeker/resources/). Job Seekers can create job alerts so that they get notified when a new ad is listed.

Employers can view the uploaded anonymous resumes for free. If they see one that they find interesting, they can contact the Job Board managers to let them know that they would like to contact the person who posted the resume. The Job Board managers will then get in touch with that person and if he or she would like to follow it up, they will connect employer and potential employee for a fee of $35.00, payable by the potential employer.

From the (passive) job seekers' view they have nothing to lose. Their resume just sits there waiting for the right employer to see it.

We are lucky to have this great tool on our website. It did not cost the Statistical Society anything to have the Job Board installed. We now share the fees with the Job Board managers, "Your Membership", based in the US. Our Job Board will not make the Society rich or even contribute significantly to its income. However it does provide an extra service for our members and I hope that one day it will develop into the hub for all things to do with the statistical job market.

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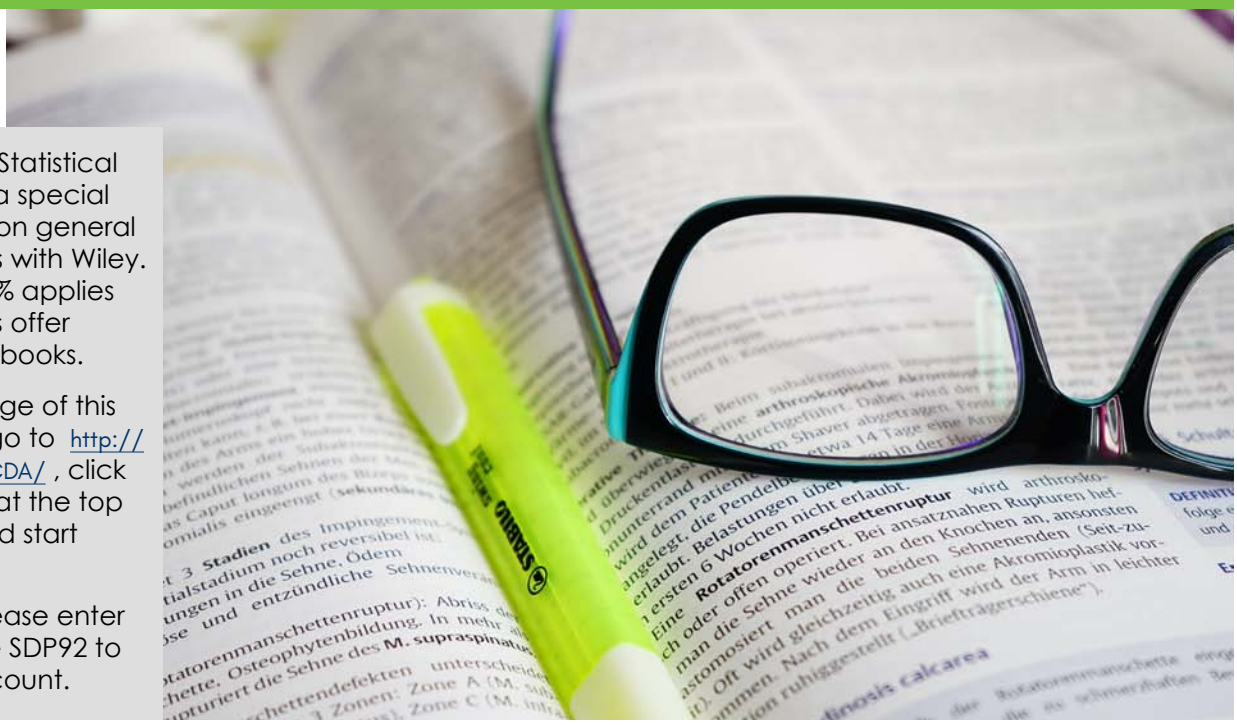

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