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Honours and Higher Degrees in Statistics Completed in Australia 1959-88/89

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The following tables and graphs summarise the available information concerning the numbers of students completing honours degrees, research masters degrees and doctorates in statistics at Australian universities. The tenth Australian Statistical Conference provides a good opportunity to make this information available to statisticians.

The data are taken from a collection which includes information on mathematics qualifications completed in Australia at honours and higher degree level. I have been collecting and publishing this series of data since 1984. The project was started by Professor J.B. Douglas, and is carried out under the auspices of the Australian Mathematical Association. The aim of the project is to make accurate and up-to-date information available to the mathematical community. The data for last year's (1989) honours degrees have just been processed: the higher degree data for 1989 are being collected at the moment.

For historical reasons, the collection involves honours and higher degrees completed at Australian *universities*. I have been using as my definition of university 'any institution accepted as such by the Australian Vice-Chancellors' Committee': this leads to the inclusion for the 1989 figures of the Queensland University of Technology. Four other universities will be included for the 1990 figures (Northern Territory University, The University of Canberra, The University of Western Sydney and Charles Sturt

University). The exclusion of other institutions from the collection is not important since, to my knowledge, none of them has graduated students with these qualifications.

In previous publications, I have compared the rise and fall of the numbers of honours and higher degrees to the overall numbers of university students. Recent government initiatives to end the binary system of higher education, and the consequent changes to published statistics, have led me to change this particular aspect of the data collection. Henceforth, comparisons will be made with the total number of students in higher education.

The numbers of university students in Australia increased steadily from 1960 until the late 1970s. There followed a period of slower increase during the 1980s, and a sudden period of strong growth at the end of the decade (caused in part by the inclusion of some of the new universities). In contrast, the numbers of higher education students show a fairly steady increase over the last 30 years.

The figures for higher education students were obtained in the following way. From 1980-90 from *Selected Higher Education Statistics* (published by DEET); from 1969-79 from *Year Book Australia* as a sum of university students and students at colleges of advanced education (and at teachers' colleges when they were not included in the CAE figures); from 1959-68 as 1.5 times the numbers of university students. There did not seem to be any obvious way of getting accurate figures from this early period before the creation of colleges of advanced education. If anyone can obtain more accurate figures for the period 1959-68, I would be grateful to have them.

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Figure 1 shows for the period 1959-89 the numbers of honours bachelor degrees in statistics against the background of total numbers of students in higher education. A steady and steep rise peaked in the early 1970s, and then declined over the next decade. The data for the last few years are somewhat ambiguous; they seem to show a general increase, but the figures for the last two years make any prediction rather dangerous.

The numbers of honours degrees broken down by universities are shown in Table 1. Monash University has awarded the most honours degrees in statistics over this period (180 of a total of 810). The breakdown into males and females is also indicated. Over the whole period, only 29% (231 of 810) of the honours degrees have been awarded to females: however, over the last five years (1985-89) this has risen to 49% (81 of 164 degrees), showing that in this area the equality of the sexes has become a reality.

Figure 2 shows for the period 1959-89 the numbers of research higher degrees in statistics against the background of total numbers of students in higher education. The graph shows evidence of increases in the early part of this period and a slight decline since the early 1970s, but the absolute numbers remain small and quite variable from year to year.

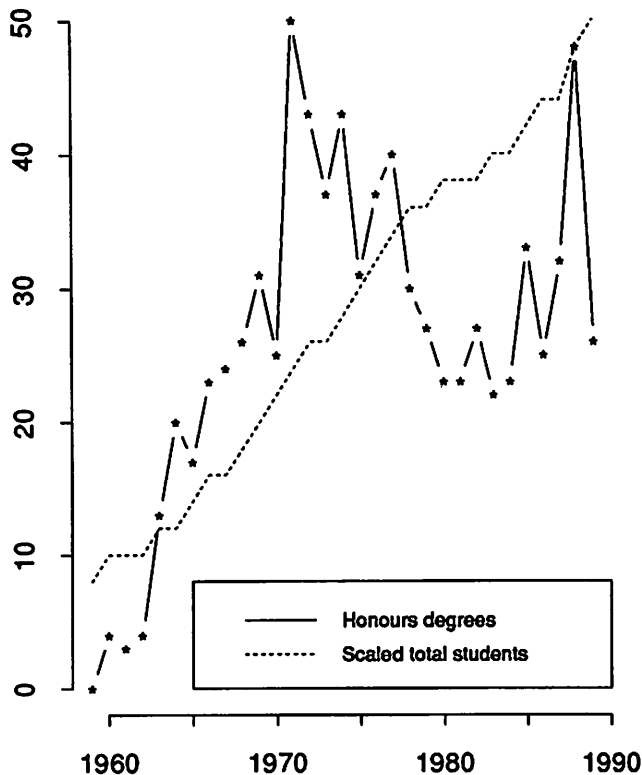
The numbers of research masters and doctorates broken down by universities are shown in Tables 2 and 3. The

University of Melbourne has awarded the largest number of research masters degrees in statistics over this period (43 of a total of 168), and the Australian National University leads the number of doctorates in statistics (57 of a total of 193). Once again, the breakdown into males and females is also indicated. Over the whole period, 24% of research masters degrees (41 of 168) and 11% of doctorates (22 of 193) have been awarded to females. Over the last five years (1984-88) this has risen to 44% for research masters degrees (10 of 23), but remains at a low 13% for doctorates (5 of 40). This last figure is pertinent in the context of exhortations to achieve a more even sex-balance in university statistics departments.

Many more interesting facts could be obtained from these tables, especially when they are linked with educational and political changes and with information about similar trends in related areas of tertiary study (such as mathematics and computer science). John Graunt's comments on his *Natural and Political Observations ... upon the Bills of Mortality*, published in 1662, are appropriate to this collection of data. He wrote:

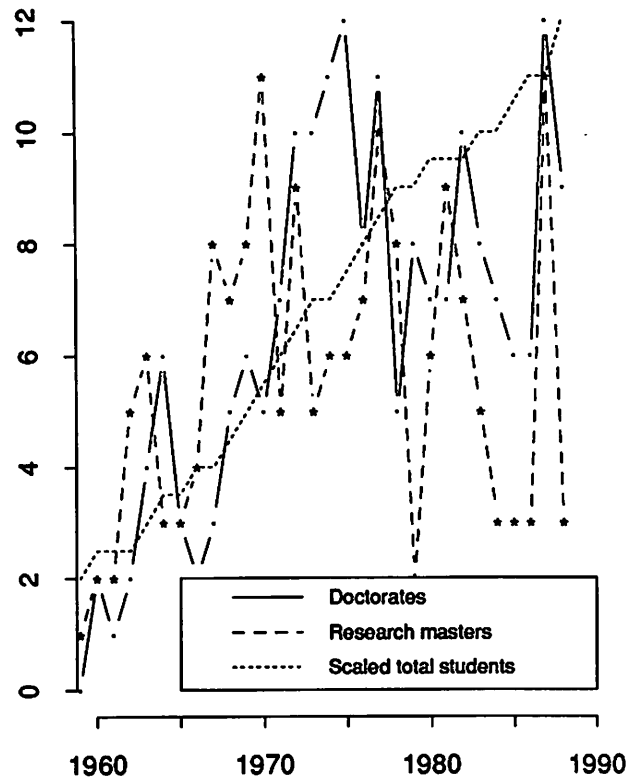
There is much pleasure in deducing so many abstruse and unexpected inferences out of these poor despised Bills' and 'a clear knowledge of all these particulars ... is necessary in order to good, certain and easie government'.

Figure 1



Honours bachelor degrees in statistics, 1959-89.

Figure 2



Research higher degrees in statistics, 1959-88.

Table 1: Honours Bachelors Degrees in Statistics, Australia 1959-89

		'59-'70	'71	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	Tot
Adelaide	M	15	1	3	5	4		1	6	4	3	1	2	1	1	2	3	3		5	3	63
	W	2	1		1	1		3	2		1	2	2	2	1	3		1	4	1		27
ANU	M	10	1	2	2	1	3	1	2		1			1				1	1		2	28
	W	1	1			1	1	1	1		2	1					1	3	1	1	1	15
Flinders	M	4	2	6	2	3	4	1	2											1		25
	W	1						1												1	2	5
La Trobe	M	1	3	2	1	4	2	5	1	3			1	1	1	2	1	4	1	1	1	35
	W	1	2			1	2	2	2	1		2					2		2	2	4	21
Macquarie	M					1				2	4	2								1		10
	W					1		1		2		1				1						6
Melbourne	M	27	4	7	4	6	2	5	3	5	6	3	2	2	2	1	1	3	3	3		89
	W	3	3	2	1	2		2		2		3	1		1	1	1	1	4	1		28
Monash	M	13	11	5	11	6	8	8	8	5	3	3	2	7	3	5	6	2	3	10	3	122
	W	3	1	1	3	5	1		5	1	3		4	2	6	2	6	3	4	8	1	58
New England	M	36	4	2	2				1	1	1					1						45
	W	5		1		1																11
NSW	M	11	1	3	1		3	1	2	1	1		1	2	1	1	2	1		3	2	37
	W	3	1				3	1								1	1		3	3	5	21
Queensland	M												2				1					3
	W																1					1
Sydney	M	35	3	4	1	3	2		3		1	3	3	2			1					61
	W	7	5	1													2	1	2			18
W. Australia	M	10	6	3	3	3		7	2	3	1	2		2	2	1	2		1		1	49
	W	2	1	1							1				1	1			1	1		9
Others*	M											1	2	1	1		2			4	1	12
	W												1	2	1	1	1	1	2	2		11
Totals		190	50	43	37	43	31	37	40	30	27	23	23	27	22	23	33	25	32	48	26	810

* Universities from which fewer than 10 have graduated over the 30 years in all three tables:-
 -Curtin, Deakin, Griffith, James Cook, Murdoch, Newcastle, QUT, Tasmania, UTS, Wollongong.

Table 2: Research Masters Degrees in Statistics, Australia 1959-88

		'59-'69	'70	'71	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	Tot	
Adelaide	M								1													1	
	W		1																		1	2	
ANU	M	7	1		1	3		1	1		2		2	2			1					21	
	W			1							1											2	
Flinders	M							1			1				1							3	
	W																					0	
La Trobe	M												1						1			2	
	W									1								1				2	
Macquarie	M													1								0	
	W																					1	
Melbourne	M	11	4	1	3	1	1		2		2		1	3	3		1			5		38	
	W	1						1		1										1	1	5	
Monash	M	1	1		1		1	1		2	1	1				2				1		12	
	W				1		1			1			2		1					1		7	
New England	M	3		1									1									5	
	W	1													1							2	
NSW	M	9			1	1	1															12	
	W			1			1						2									4	
Queensland	M	1		1							1					1				1		5	
	W	1						1	1	1		1										5	
Sydney	M	7	3		2			1	2	2								2			1	20	
	W	3																		1	1	5	
W. Australia	M	3					1			2					1							7	
	W																1			1		2	
Others	M	1																				1	
	W		1													2					1	4	
Totals		49	11	5	9	5	6	6	7	10	8	2	6	9	7	5	3	3	3	3	11	3	168

Table 3: Doctorates of Philosophy in Statistics, Australia 1959-88

		'59-'69	'70	'71	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	Tot
Adelaide	M	2	1	1	1		2		1									1		1	1	11
	W							1														1
ANU	M	14	2	4	2	2	1	1	3	4	3	1	2	2	1	1	1	2	1	2	3	52
	W				1						1	1								2		5
Flinders	M					2			2						2	1				2		9
	W				1																	1
La Trobe	M									1		1	1	1	1			1				8
	W				1											1					2	2
Macquarie	M							1														1
	W																					0
Melbourne	M	1			2		1	1		2						1	2				1	11
	W					1																1
Monash	M	1	1			3	1	3		3		2	1	1	2	3	1		2	1		25
	W																					0
New England	M																					0
	W							1												1		2
NSW	M	3		1	1	1	2	2	1		1		1	1			2		2	1	1	20
	W	1	1																			2
Queensland	M				1		2	1					1								1	6
	W											1					1					2
Sydney	M	6				1		1						1								10
	W	1												1								2
W. Australia	M	4		1				1	1	1					3			1		1		13
	W																					0
Others	M	1										2	1									5
	W						1								1	1		1				4
Totals		34	5	7	10	10	11	12	8	11	5	8	7	7	10	8	7	6	6	12	9	193

VALEDICTORY ADDRESS - Part III

A.T. James

Statistics for a Ph.D.

In 1932 the Waite Institute appointed Alf Cornish, an Agricultural Science graduate from Melbourne as an assistant agrostologist. Some time later, the story goes, he went to Professor Wilton of Mathematics, showed him a paper on mathematical statistics, pointed to a capital Γ , and said, "What's that?" Professor Wilton replied, "How much mathematics have you studied?" Cornish indicated year 9. Professor Wilton said, "Well if you study year 10 mathematics, then University maths at first year level, second year and third year, then I'll be able to explain the gamma function to you." To Wilton's astonishment, Cornish said, "Right, how can I do that?" Wilton presumably indicated books to read and offered to coach him. Cornish not only discovered what the gamma function was, but went right to Honours Level Mathematics and became able to read the mathematical statistics literature. Wilton's generosity in giving of his time to Cornish bore the University much fruit. Dr Cornish was later awarded a D.Sc. and became the Foundation Professor of Statistics.

In the meantime, the Waite Institute wondered why their agrostologist spent a large part of his time studying mathematics, and according to Colin Donald, later a professor at the Waite, even considered sacking Cornish.

However, before this happened, they discovered he was useful in helping them with statistical analysis of their

results, so instead, they gave him one year's leave from 1937-38 to go and study with R.A. Fisher.

Cornish was one of the few people who co-authored a paper with Fisher, and more surprisingly as first author.

On his return in 1938, Cornish was appointed Statistician at the Waite until he joined the CSIR in 1941.

In 1944, Professor Sanders, with approval and support from Sir William Mitchell and Sir David Rivett arranged to house Cornish's newly constituted CSIR Section of Mathematical Statistics within the Mathematics Department of the University of Adelaide, then housed in the Mitchell Building.

The forceful characters of Sir William Mitchell and Sir David Rivett, coupled with the independence enjoyed by their respective organizations at that time, allowed them to make such mutually profitable arrangements very expeditiously.

From 1943 onwards the Mathematics Department, like much of the rest of the University, became desperately short of space, but all new building was frozen until after the war. In spite of this, Professor Sanders and Mr Statton generously surrendered their rooms to make way for Dr Cornish and his Section of Mathematical Statistics and put up with the inconvenience until the Mathematics Building was completed in 1947.

The first time I met Sir William Mitchell was at a little informal gathering at the University with Sir David Rivett on the occasion of Rivett's retirement as Chief Executive

Officer of CSIR in 1950. In the reconstitution of the CSIR, the name had just been changed to CSIRO, and in his speech, Sir William said, "We trust the O means naught." Surprisingly, it didn't mean very much for 28 years. The latent government powers over the reconstituted CSIRO were not fully exercised until the time of Paul Wild in 1978.

The post-1978 move in CSIRO from fundamental science to industrial technology throws a big responsibility back onto the universities for fundamental science and training of scientists. At present, the cuts in university funding over the last 14 years in relation to their increased undergraduate teaching loads raise doubts as to whether the universities can shoulder the task adequately now.

An anecdote of the Librarian, Mr Cowan, contrasts the characters of Wilton and Mitchell. When Professor Wilton was Chairman of the Library Committee, Mr Cowan had great difficulty because he could never get a decision from the Committee. Later Sir William Mitchell took over the Chairmanship and that was much more satisfactory, Sir William could give him the decisions even before the Committee met!

After graduation in 1944, I joined CSIR and learnt mathematical statistics under Dr Cornish. Within one year, I was handed some lecture notes and given the job of lecturing Statistical Methods, a second year mathematics half subject. It indicates the desperate shortage of statisticians. I continued my statistical studies, attended very interesting honours courses of Schwerdtfeger largely based on work of Elie Carton and Weyl, read mathematics and gained some experience in the practice of statistics but after 4 or 5 years, there was no way further forward in Australia. Fortunately, when CSIR was set up in 1928, Sir David Rivett had recognized that the Australian universities were not adequate to train research scientists and had persuaded the Commonwealth Government to set up a considerable fund for CSIR studentships overseas.

I am very indebted to Dr Cornish that he procured one for me; but where to go? Dr Cornish considered one of the most urgent tasks was to develop the theory of linear models in matrix algebra, but Fisher's successor at Rothamsted, Dr Yates, was, for some years to come, crossing out matrices from the papers of his staff when he vetted them for publication, saying matrices were unnecessary in statistics, and in fact he is still waging a campaign against the use of groups and their matrix representations in statistics.

From personal experience in England, and the promise of multivariate analysis being mathematically developed by Sam Wilks among others, Cornish chose Princeton University as the most appropriate place for me to do my graduate study.

I don't have time to outline my studies at Princeton, but Tate's lectures in algebra opened the way to read Weyl's Classical Groups and Feller's lectures in probability theory showed how a mathematician goes about his job.

At the Institute, Van Neumann's lectures were very simple and clear. He talked all around his subject, speaking

twenty to the dozen, and answered every conceivable question you could ask before you had time to think of it.

My talk has largely centred on mathematics because mathematics played the predominant role in statistics in those days. At Princeton when we new graduate students were gathered together on the floor of the *sanctum sanctorum*, the Professor's lounge, for a briefing by Chairman Lefschetz, I said I wanted to concentrate on statistics. Lefschetz replied, "At Princeton, James, you're a mathematician first and a statistician second." In absolute terms the role of mathematics has not decreased, but big developments in other areas have reduced the relative role of mathematics in statistics to a less important, albeit vital one.

Consequently an eminent British statistician, D.J. Finney wrote,

"Although statistics is in many ways dependent upon mathematics, it is not a branch of mathematics, either pure or applied."

D.J. Finney, FRS 1986

John Tukey of Princeton, a topologist by training, played a major role in shifting the emphasis from mathematics to data analysis. Big developments in statistics have been the logic of inductive inference, and the empirical validation of statistical methods along with their extension into new and wider fields. Statistics is not an axiomatic mathematical system, but an empirical science based on well tried and proven methods of gathering, analysing and interpreting data.

R.A. Fisher and F. Yates have also repeatedly asserted that in Statistics, as in other empirical sciences, mathematics is a means, not the basis of the science.

In 1963 Yale University set up a separate Department of Statistics. They considered three full professors plus other staff was the minimum for a viable department.

Cambridge has a Department of Pure Mathematics and Statistics. The most evident link between the disciplines and economy in their amalgamation was the sharing of a kitchen between their respective tearooms.

Another major revolution has been the shift from statistical calculation on desk machines to statistical computing.

Has statistics then moved into computer science? No. Though the development of statistical languages requires computer science along with statistics, their correct usage is straight statistics. The big challenge at the moment is computer graphics in statistics.

I have appreciated the opportunity to take a half-time position for the last 4 years prior to my retirement, made possible by Bill Venables taking the Chairmanship. I would advocate this policy as an alternative to early retirement, particularly since the money saved can be used to employ younger people as tutors to pay off early retirees!

Culturally, Australia has been enriched by its immigrants. In this respect, I think the Australian universities and institutions have been more conservative clinging to old traditions of Britain and the Empire. The US universities

long ago woke up to multiculturalism as the path to world class standing.

Under Mitchell's leadership, the University prospered in the 20's and then survived the 1930's and 40's depression and war. My experiences reflect the inevitable depredations of its impoverishment. The general public seemed unaware. They had their own financial problems.

Without Mitchell's dynamic leadership, it could have been much worse and it is a tribute to him that it was able to respond so well when Federal funds started to flow in. At the end of the war, Mitchell had the building plans ready and Adelaide must have been one of the first universities off the mark. But though he was personally a man of means, he must have been very frugal, for he kept the staff as poor as churchmice. Sanders had to mark PEB exam papers till midnight to maintain a living.

Consequently, it was left to his successor, Mr Rowe, who secured the increased grants for staffing to lead the University into the promised land.

Finally, I would like to acknowledge the dedicated work of my colleagues in the Statistics Department.



The University of Sydney

AUSTRALIA

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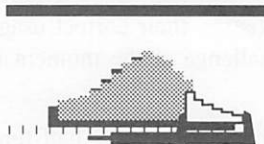
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System Requirements: IBM XTs, ATs, 386s and Compatibles

BRANCH REPORTS

New South Wales

Statistical Education

The Branch's Section on Statistical Education, convened by Pamela Shaw, organised the August meeting of the Branch. Professor Richard Scheaffer (University of Florida) spoke on "Statistical Education in the United States: Current Trends and Challenges for the Future."

Richard discussed programs in statistical education in schools, in industry and in colleges/universities.

Although there is no regulatory authority, the Mathematical Sciences Education Board (of the NAS) had recently recognized the importance of statistics, as had the NCTM in its recommendations of standards.

Richard provided the background to the Quantitative Literacy project (of the ASA and NCTM). Its four main areas were in in-service workshops, curriculum materials, guidelines, and dissemination. It aims to use real data and provide hands-on experience. The requirement of essay-type answers is unusual in mathematical strands. The emphasis is on exploratory techniques, with little formal statistics. Examples were given with data from the social sciences and the sciences.

In industry many CEOs have declared the importance of thinking statistically. The emphasis in industry is clearly different from that in schools. In his discussion of statistics in industry Richard illustrated the seven steps for process improvement.

In US colleges there has been an increase in enrolments in statistics (across all disciplines). Recent progress was evidenced by the video series "Against all Odds", and programmes of the MAA and AMATYC.

Richard could see many opportunities for statisticians. The success of statistical teaching was not uniform. Those teaching traditional statistics in colleges need to learn from the success of the more data analytic approach in schools and industry.

In closing Richard described the Center for Statistical Education recently set up by the ASA.

Regression Diagnostics

At the September meeting of the Branch, Dr Simon Sheather (Australian Graduate School of Management, University of NSW) spoke on "Regression Diagnostics — Ignore them at your peril".

Simon stressed the importance of checking assumptions in the regression model and identifying outliers and influential observations.

Simon suggested that least squares estimation does not always provide satisfactory diagnostics and illustrated the problems encountered with an example analysed in minitab.

After revising the least squares based methods Simon introduced robust methods used in regression, and showed how to obtain diagnostics based on them.

He demonstrated these on several data sets, showing how successful these methods could be.

Multiple Choice Tests

The speaker at the October meeting was Dr Paul Hutchinson (University of Sydney) who spoke on "Ability, Partial Knowledge, Guessing: Statistical Modelling Of Multiple-Choice Test Performance."

Multiple choice tests are used in many disciplines and at all educational levels. In the 70 years in which these tests have been used there have been two main theoretical ideas. One involves a correction for guessing. The second, item response theory (IRT), focuses on the probability of a correct response by an individual examinee to an individual item in the test.

Paul outlined the main properties of IRT, including the item characteristic curve (which relates probability of a correct response to the examinee's ability), and questioned its ability to be adapted to psychological description or to different formats of test.

Paul described the cognitive analysis approach in which a detailed analysis is made of the cognitive tasks required to successfully answer an item. It may be several decades before benefits are available from this approach.

Paul then described his mismatch theory approach. This is an attempt to plug the gap between IRT and the cognitive approach. He showed how particular distributions lead to results obtained by earlier methods.

Mismatch theory can be applied to tests of different formats. Paul considered in detail the answer-until-correct format. Whereas conventional theory implies that a second try must be a guess, there is some empirical evidence against this. Paul showed how mismatch theory handles this format.

Mismatch theory can also be cast into a form where performance can be attributed to item difficulty and the examinee's ability.

Symposium on Regression

The NSW Branch is to hold a symposium on Modern Regression Methods on 2 - 3 April 1991. Speakers include Raymond Carroll, David Ruppert and Sanford Weisberg. Full details may be found in the Conference section.

Victoria

CSIRO, DMS Hallucinations, Nightmares and Visions

The 1990 Belz lecture was given at the September meeting by Dr Ron Sandland, chief of the Division. Dr Sandland outlined the history of Statistics within CSIRO from the appointment of Betty Allen in 1930, through the gradual increase in the number of Statisticians to the formation of

the Division of Mathematical Statistics in 1970 under A.E. Cornish. He was followed by J. Gani and T. Speed, who brought about substantial changes to the division, but these enabled it to survive better the attack on it in 1987. After a description of the developments in 1987 which led to the establishment of Biometrics units in other CSIRO Institutes, he outlined where he saw the Division going in the future. The Division currently has four areas of interest: Applied and Industrial Mathematics; Applied and Industrial Statistics; Signal and Image Analysis and Computer Software and Networks. Dr Sandland said that Statistical research is at its best when the problems arise from the real needs of leading edge users and illustrated this with the examples of fission track dating and signal and image analysis. This latter illustrates the rapid increase in the quantity and complexity of data which modern technology is capable of collecting and Statisticians still have to come to terms with dealing with this complexity. Statisticians must become a more active profession as the Division has done. The organization has had to become more profit orientated with the requirement that Divisions earn 30% of funds from outside contracts. The danger in this is the concentration on short term small projects with immediate return at the expense of larger, long term projects which are going to need special funding allocations.

The State of Statistical Education

The August meeting consisted of a panel discussion on the state of statistical education. Niels Becker, Nick Garnham and Ken Sharpe, who had all recently returned from ICOTS3, believe that a number of issues need to be addressed including:

- the movement of students away from statistics into computer science and business oriented courses;
- the rewarding of "good" teaching;
- the introduction of more exciting and innovative teaching methods such as videos and dynamic graphics;
- the need to train "all-rounders" who have the communication and thinking skills necessary for statistical consulting as well as an appropriate breadth and depth of statistical knowledge.

Queensland

Service for distant members

The Queensland branch has recently introduced a new service for our more distant members who have difficulty attending meetings. Since April we have been taping (auditory only) each talk given at our meetings and making copies of these available.

Software Reliability Assessment

During his short visit to the Department of Mathematics at the University of Queensland, Dr Alan Veevers from the University of Liverpool, discussed some aspects of Software Reliability Assessment at the July 1990 Queensland branch meeting. Complex systems such as aircraft engines, chemical process plants and nuclear power stations routinely have probabilistic risk assessments performed on them. The techniques used are

widely accepted for 'hardware' components, less so for 'human' components and no consensus has been reached for 'software' components. As examples of software failures arise frequently, sometimes with disastrous results, the demand for a better understanding of software reliability is accentuated. Alan raised the questions of how to identify and quantify software reliability. He also discussed the potential role for statistical methodology and the new directions being explored. Alan drew on his experience obtained while working as an applied statistician on research sponsored by the UK ILVEY directorate and the European ESPRIT initiative to illustrate his points.

Review of EM Algorithm

Following time spent in Dunedin, NZ as an invited speaker at ICOTS3, Dr T. Krishnan from the Indian Statistical Institute, Calcutta, visited the University of Queensland for three weeks. While in Brisbane Dr Krishnan presented a review of the EM Algorithm to a well attended branch meeting of the Statistical Society. The review of this elegant and effective method of computing maximum likelihood estimates of parameters included examples, history, theory, methodology and applications.

South Australia

(Nearly) everything you might want to know about Statistical Education in Forty Minutes

Margaret Gallimore (Deputy Director, Centre for Statistical Education, Sheffield) addressed the 8 August Branch meeting.

Most people have heard of Mathematical Education, but Statistical Education??

Mathematicians would probably tell you that statistics is simply a part of mathematics and even statisticians tend to assume that the subject will be taught in much the same way as mathematics. The Centre for Statistical Education is devoted to promoting a more truly "statistical" education with mathematics being used as a tool of statistics rather than statistics being viewed as an application of mathematics. Margaret Gallimore talked about what characterises "statistical" education and the strategies employed by the Centre in promoting statistical education in Britain.

Statistics of Extreme Sea Levels

On 28 August the Branch was addressed by Jonathan Tawn of the Department of Probability and Statistics, Sheffield.

For the design of sea defences the main statistical issue is to estimate the distribution of annual maximum sea levels for all coastal sites. Traditional procedures independently analyse data from each individual site, thus known spatial properties of the meteorological and astronomical tidal components of the sea level are not exploited. By spatially modelling the "at site" behaviour and the "inter site" dependence of sea level data, improved precision of estimates and increased understanding of the physics of extreme sea levels are obtained. Jonathan Tawn illustrated these features by use of British and Australian data.

Assessment of Surface Roughness and Texture

Graham Constantine of (CSIRO, Division of Mathematics and Statistics, Adelaide) gave a talk on 25 September describing a number of methods attempting to characterise the surface roughness by power spectra and "fractal" dimension concepts.

The assessment of surface topography is important in many applications, including precision engineering, biocompatibility, electrical contact, etc. High precision equipment for measuring surfaces to very high resolution is available, but the parameters usually computed to characterise surface texture are inadequate.

The Political and Statistical Dimensions of the Debate over Adjustment of the US Decennial Census

Stephen E. Fienberg (Carnegie Mellon University, Pittsburgh, Pennsylvania) addressed the 25 October meeting.

The United States is the midst of completing the 1990 Decennial Census and the accuracy of the census population count is being questioned well in advance of the official date for release of the count December 31, 1990. As the complexity and uses of the US decennial census have grown over the years, so have the costs. Because of the substantial costs and the political outcomes that are linked to the census, the accuracy of census data has been the focus of a major public debate (and lawsuit against the government) involving statisticians, public officials, and politicians from both major political parties, as well as various political action groups. Among the major concerns is the differential undercount between Blacks (and other ethnic minority groups such as Hispanics) and Whites. The talk explored ethical, political and social aspects of the debate surrounding the 1990 census, and the role Professor Fienberg believes statistical models should play in its resolution.

Western Australia

Cohen's Kappa

The July branch meeting was addressed by Barry Garner from the NH&MRC Research Unit in Epidemiology and Preventive Medicine. Barry gave a brief introduction to Cohen's Kappa as a measure of agreement between two raters and then showed how it had a nice use in sample size estimation for matched pairs analysis. He also showed how to calculate a standard error when estimating Kappa, even when it is non-zero, and the general $r \times r$ case.

Identifying Subgroups in Medical Research by Partition Analysis: Who Needs Linear Models?

In August, Roger Marshall of Auckland University presented an alternative to the Classification and Regression Tree (CART) approach to developing clinical diagnosis procedures. This alternative is possible whenever there is prior knowledge of the directions of the associations between the diagnostic variables and the clinical condition. In this circumstance, by using his concept of regular Boolean expressions, Roger explained how to arrive at good diagnostic procedures through a

computerised search method. The resulting procedures avoid the contradictory combinations sometimes arising from applications from CART. Roger also argued that his method is much more in tune with the way clinicians think — in terms of clustered subgroups defined logically, not weighted scores added arithmetically.

Estimating the Electrostatic Charge on Uranium Ore Dust

The speaker at the branch's September meeting was Geoff Riley of Alcoa of Australia. Geoff explained an estimation problem he had worked on jointly with Jiri Kvasnicka of the N.T. Department of Mines and Energy, during his previous employment as a Siromath Consultant in Darwin. This estimation problem led to a non-linear regression model for the data from an electrostatic elutriator, a device set up especially for the purpose. After explaining the physical and mathematical basis for the model, Geoff presented the results of fitting it to the data. The evening ended with a stimulating discussion of the design and modelling issues to which these results led.

Canberra

A Model for Bird-ring Recovery Data

Dr Ted Catchpole, University College, Australian Defence Force Academy, addressed the Branch at the August 21 meeting. Dr Catchpole described his recent work on a bird-ring recovery experiment. The aim of the experiment was to estimate the probability of survival of a bird in each of its first k years of life. The data for the experiment was obtained as follows. Each year 5000 birds (usually nestlings) were ringed and released to form a new cohort for the study. Over time some of the birds from the new and older cohorts died, and some of the dead birds were discovered and the rings recovered. The number of rings recovered each year was recorded for each cohort. Given information on the number of birds ringed and the number of rings recovered, Dr Catchpole described Seber's classic model for estimating survival. In describing a range of solutions to the model, Dr Catchpole made particular reference to problems involving bias and 'out of bounds' estimates that are obtained with maximum likelihood.

Prediction regions: What should they accomplish?

Professor Rudy Beran, visiting from the University of Berkeley, addressed the Branch at the September 18 meeting. Professor Beran discussed the principles and methods for the design of good prediction regions, including the situations where the variable to be predicted is vector or function valued. After introducing the notion of a learning sample, Professor Beran discussed a range of issues affecting design. The issues discussed included: appropriate convergence, as the size of the learning sample increases, of conditional and unconditional coverage probabilities; probability centring of prediction regions, both conditionally on the learning sample and unconditionally; and tweaking critical values to improve the level and accuracy of unconditional coverage probabilities. Professor Beran used numerous examples to illustrate the design issues and proposed bootstrap constructions for good prediction regions.

AUSTRALIAN BUREAU OF STATISTICS

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Information from the population census has been analysed to provide you with the most accurate profile of the Australian people that you'll find anywhere.

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INDEX OF ECONOMIC RESOURCES
INDEX OF EDUCATION AND OCCUPATION

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The Indexes of Relative Socio-Economic Advantage and Disadvantage are general socio-economic indexes. Underlying the Index of Relative Socio-Economic Advantage are indicators of well-being (eg. high income, tertiary education, skilled occupations). In contrast, the variables used in the Index of Relative Socio-Economic Disadvantage focus on attributes of an area like low income, relatively lower educational attainment and high unemployment.

The Indexes of Economic Resources and of Education and Occupation are more specific. The first of these concentrates on a number of aspects of the economic resources of a household, including income, housing and car ownership, while the second summarises the education and occupation aspects of socio-economic standing. An area will score highly on the Index of Economic Resources if it contains a large proportion of households with high incomes, large dwellings, and several cars. Similarly, an area will have a high score on the Index of Education and Occupation if it contains a relatively high proportion of people with higher education qualifications, or employed people in skilled occupations.

The five index scores are available for CDs, legal local government areas (LGAs), Statistical Local Areas (SLAs) and postcodes. Index values for regions other than postcode, LGA or SLA may also be calculated easily.

The Indexes are available on both 3 1/2" and 5 1/4" floppy discs with User Manual, plus an Information Paper designed for people wanting a comprehensive understanding of the development of the product including its history, technique and variable listing.

Further information, including a brochure can be obtained by contacting :

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SPECIAL INTEREST SECTIONS

Statistical Education

There were allusions in the last Newsletter to the shortcomings of the colleges at the University of New South Wales where delegates to the 10th Australian Statistical Conferences/2nd Pacific Statistical Congress stayed. I recently wrote to the Master of the colleges, pointing out what I thought were the chief problems, and suggesting how they might be overcome. No reply has been received as yet. While I wait and hope for a response, I trust that the Perth organisers of the 1992 Conference have been inspecting accommodation to be offered for the 11th Conference. Like most others, I concentrate better when I am wide awake and not suffering from lack of sleep due to imminent hypothermia.

Accommodation aside (and that was not the fault of the organisers), I thought that ASC10/PSC2 was well organised and definitely worth attending. Congratulations to all those associated with its organisation.

STOP PRESS: A positive reply has been received from the Kensington Colleges. It seems that it is worthwhile to make constructive criticisms.

A contingent from Australia attended ICOTS3 in Dunedin, New Zealand. There was something on offer for everyone at the Conference, but perhaps without many outstanding highlights. The college accommodation was great, but brickbats all round for the Local Weather Committee, who forgot to turn off the aerial taps. The problem is unlikely to occur at the next ICOTS conference, which will be held in Morocco.

We have a few nibbles in relation to my request in the last Newsletter for someone to take over as Chairperson of the Education Section of the SSA. These have been passed on to the Central Council, who will make a decision on what to do. As to my mention two Newsletters ago that comments are being sought on what Statistics groups at Universities do to provide interesting displays at Open Days, the response rate is proving that statisticians are just as slow to respond to surveys as other people. If you are one of the non-respondents, please write back to me now. The replies from those who have responded suggest that useful displays are felt to be rare, but are eagerly sought.

Ken Russell

Industrial Statistics

Over the last few months, important developments in the Quality Movement in Australia have been taking place.

- the formation of the Quality Society of Australasia (QSA). The QSA is a professional body and has established standards of education and experience necessary for membership. Its aim is to provide recognition and professional status for quality practitioners through its accreditation system. Membership details are available from me.

- the formation of the Australian Quality Council (AQC). This Council is the peak body of four organisations: the QSA, the Australian Organisation for Quality, the Total Quality Management Institute and Enterprise Australia. The AQC aims to lead the strategic direction of the Quality Movement in Australia and co-ordinate its member organisations to act consistently within this framework. The establishment of the AQC follows, in spirit at least, from the recommendations of the Foley Report.

Through our President, Richard Jarrett, I have held preliminary discussions with the AQC on the role that the Statistical Society might play in the Council. The exact mechanisms by which the Council will work are still being decided, but there appears to be scope for the SSA, as an affiliated member of the AQC, to contribute to various task groups to be set up. Discussions continue.

There is an active interest in government and industry in the accreditation of statisticians to work in these areas, both on quality matters and more generally. I have had informal discussions with the QSA on the possibility of a joint QSA/SSA accreditation scheme. We believe the approach is feasible, but much remains to be done before a proposal could be put to either Society.

Still on accreditation matters, the National Industry Extension Scheme (NIES) has approached the Section for a list of statisticians with industry experience, and I will shortly be writing about this to all members who have expressed an interest in the Industrial Statistics Section.

Another activity of the Section is the joint sponsoring with Bond University of a one day seminar for statisticians by Peter Scholtes, next February. Peter works with Joiner Associates in Madison, Wisconsin, and is a leading authority on the implementation of Quality Management techniques, particularly on the human relations side. He is the principal author of the "Team Handbook", and an excellent speaker.

The day for statisticians will be on the subject "Some Principles and Tools for the Statistical Consultant" and will include a review of the important role of data and statistical thinking in management change, the role of statisticians, and how they can be effective in influencing management and change. The seminar will be on Thursday 7 February at the Shore Inn, Artarmon (Sydney).

Statistical Society members can attend for the discounted fee of \$225 instead of the non-members fee of \$275. A day not to be missed if you have an interest in Quality Management! Application forms will be available from me or from Lyn Hathaway at Bond University.

Peter will also present two other courses in Sydney, both sponsored by Bond University: "Performance Appraisal: New Directions" on Monday 4 February, and "How to Use Teams to Improve Quality" on Tuesday 5 and Wednesday 6 February. Further details are given elsewhere in this Newsletter.

John Field

THREE OPPORTUNITIES TO HEAR PETER SCHOLTES IN PERSON!

Peter Scholtes is recognised as a leading expert on the implementation of Quality Management systems. Working with Joiner Associates, he is the principal author of "The Team Handbook". He will be giving three seminars in Sydney next February.

1. Performance Appraisal: New Directions

Peter will identify the problems with performance appraisals, how they decrease productivity, interfere with quality and demoralise workers. This seminar is designed for anyone who supervises people or who has the responsibility for evaluation systems, including managers, executives and human resource staff.

Date: Monday, 4 February 1991. Fee: \$400

2. How to Use Teams to Improve Quality

This course focuses on the basic ingredients needed to run project teams, beginning with creating the proper environment in the organisation. The course is based closely on the information in "The Team Handbook". This course is designed to meet the needs of people who are beginners in at least one of the three building blocks of continuous improvement: quality, the scientific approach, or teamwork.

Date: Tuesday, 5 and Wednesday, 6 February, 1991. Fee: \$800

3. Some Principles and Tools for the Statistical Consultant

How can statisticians be effective in influencing management and change? A less formal day for statisticians to discuss various quality issues with Peter Scholtes. This day is jointly sponsored by the Industrial Statistics Section of the Statistical Society of Australia.

Date: Thursday, 7 February 1991.

Fee: \$275 (Statistical Society members \$225)

All courses will be held at the Shore Inn Motel, Pacific Highway, Artarmon, NSW. Further details are available from Lyn Hathaway, Bond University, Gold Coast, QLD 4229. Tel. (075) 953324, Fax. (075) 953320.

THE UNIVERSITY OF ADELAIDE

LECTURER IN STATISTICS - (4 years Renewable)

(Ref: 9658) in the Department of Statistics, which, under its new Professor, Dr Richard Jarrett, will be extending its activities into statistical consulting in addition to its traditional roles of teaching and research. Preference will be given to candidates prepared to undertake a half teaching load plus statistical consulting. Current research projects include multivariate analysis, repeated measurements, design of experiments, quasi-likelihood methods, biostatistics, epidemiology.

Computer facilities currently include access to a Pyramid 9820 running Unix and will shortly be extended to a network of SUN Sparcstations.

Applicants should possess a higher degree in statistics, provide evidence of consulting experience, research capability and teaching ability. The position is available for four years from 1 February 1991.

RESEARCH OFFICER GRADE 1 - (2 Positions)

(Ref: 2126/2108) in the Department of Statistics. The appointees will work under the supervision of Professor Jarrett on two ARC grants and on external consulting projects.

(Ref: 2126) is available for one year in the first instance, with the possibility of renewal for a further two years and is for a project on industrial experimentation.

(Ref: 2108) is available for one year and is for a project concerning new methods of analysis for non-standard data.

Applications interested in part-time employment will also be considered and should indicate their preference.

Qualifications and Experience: Applicants should have a degree in Statistics preferably with honours, be skilled in statistical computing and have good communication skills, both written and verbal. Experience in a consulting and teaching environment will be an advantage.

Further details about the duties of the positions may be obtained from Dr A.P. Verbyla, Head, Department of Statistics, telephone (08) 228 5418, facsimile (08) 224 0227 or email averbyla@spam.ua.oz.au.

Information about the general conditions of appointment and selection criteria, where applicable may be obtained from the Director, Personnel Services at the University.

Salaries: Lecturer: \$33,163 x 7 - \$43,096 p.a.
Research Officer Grade 1: \$24,096 x 5 - \$32,212 p.a.

Applications, in duplicate, quoting relevant reference number and giving full personal particulars (including whether candidates hold Australian permanent residency status), details of academic qualifications and names and addresses of three referees should reach the Director, Personnel Services at the University of Adelaide, GPO Box 498, ADELAIDE SA 5001, Telex UNIVAD AA 89141, Facsimile (08) 223 4820, not later than 7 December 1990

The University reserves the right to make enquiries of any person regarding any candidate's suitability for appointment, not to make an appointment or, for position 9658 to appoint by invitation.

From 1 January 1991 Roseworthy Agricultural College and the City Campus of the South Australian College of Advanced Education will merge with The University of Adelaide.

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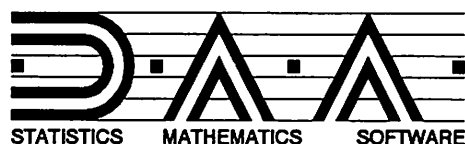
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Socio-Economic Indexes for Areas

The Australian Bureau of Statistics has released a floppy disc product of Socio-Economic Indexes with User Manual and Information Paper. The indexes use 1986 Census data to rank Collection Districts, Local Government Areas, Statistical Local Areas and Postcodes by summarising a range of socio-economic attributes. The Indexes are: Urban and Rural Indexes of Relative Socio-Economic Advantage, an Index of Relative Disadvantage, and Index of Economic Resources and an Index of Education/Occupation. Examples of variables used to construct the indexes are income at household and family levels, type of occupation held, level of education attained and housing arrangements. Further details on the index are contained in the advertisement elsewhere in this edition.

New International Journal

Elsevier Science Publishers announce the publication of the new journal *Laboratory Information Management* which covers all aspects of information technology, storage, processing and flow in a laboratory environment.

Editor: R.D. McDowall, Beckenham, Kent, UK;
Coordinating Editor: D.L. Massart, Brussels, Belgium;
Regional Editor: R.R. Mahaffey, Kingsport, Tennessee, USA.

Laboratory Information Management is directed to all who are involved in the development or use of automated systems for controlling laboratory information, such as chemists, pharmacists, computer scientists and managers in academic, clinical, industrial and government laboratories. The journal publishes original research papers, short communications, tutorial articles, critical review articles, news, book and software reviews, and software descriptions.

The journal is published as a volume of *Chemometrics and Intelligent Laboratory Systems*, but is also available separately. The first issue is to appear in 1991.

Further information and a sample copy of the first issue will be available on request from Elsevier Science Publishers, Chem. Dept., PO Box 330, 1000 AH Amsterdam, The Netherlands.

Fasts News

Contributing to Policy Development

FASTS met with Simon Crean, Minister for Science and Technology in June to raise issues such as shortages of skilled personnel, award restructuring which may alleviate this in the long-term, and the need for more post-graduate awards. The Minister undertook to follow-up FASTS concerns directly or through the PM's Science Council with relevant Ministers.

FASTS Board was to meet with the Minister on 20 August morning, and with the Shadow Minister for S & T, Peter McGauran that afternoon.

During the coming year the Coalition will be reworking its policies, and is seeking wide consultation. Dr Hewson, the Leader of the Opposition wants these policies to be cohesive, so has set up greater interaction amongst Shadow Ministers through management Committee Structures.

FASTS Member Societies should take advantage of the opportunity to have input in policy development either directly or through FASTS Board Members. This will be the first of such meetings. Continuing liaison will be maintained.

Review of "A National Statement on Girls and Mathematics"

The problem of girls and maths is not a new one. Girls' supposed lack of mathematical aptitude has been discussed since at least the middle of last century when girls were first allowed to take the University of Cambridge examination. In 1912 it was suggested that "if the presentation of topics in mathematics text-books was changed, so that the interests of girls were taken more into account, the girls' attitude to mathematics, and therefore their performances on mathematics examinations would improve".

The National Statement on Girls and Mathematics prepared by Australian Association of Mathematics Teachers provides an updated re-statement of the above.

The problem that the Statement addresses is not that girls can't do mathematics but that girls won't do mathematics. The Statement discusses the reason for the concern about the lack of female participation pointing to the "shrinkage of non-mathematical based jobs" and makes recommendations about how this lack of participation can be corrected. One of the recommendations is about changing the teaching methods. The suggested method of discussion groups, open-ended investigation, co-operative work, allowing for varied approaches reflects the strategies used in applied sections of mathematics where there is not the same right-wrong, black-white approach that many people identify with mathematics. This should be beneficial to both sexes.

The Statement is just that, a statement. It includes such statements as "girls tend to do better in number, algebra, logic and statistics, and boys in ratio, measurement and geometry without giving any information on the research on which this is based. For more detail it should be read in conjunction with *Real Girls Don't Do Maths* by Sue Willis, a Deakin University publication.

It may be that the implementation of these recommendations will result in Australia surpassing the situation in the United States where in 1989 46% of undergraduate degrees in mathematical sciences were awarded to females but only 20% of PhDs.

Copies of the National Statement can be obtained from Australian Association of Mathematics Teachers, GPO Box 1729, ADELAIDE SA 5001.

Pamela Shaw

It's still a boy's world in secondary school

In maths, for example, schools put much more emphasis on trigonometry than statistics. Trigonometry is useful for students who intend to enter a trade — mostly boys. Statistics is useful for students who enter the social sciences, mostly girls.

Most boys no more enjoy trigonometry than girls, but they accept maths as a necessary evil, a means to men's work. Girls opt out of trig while the girls opt out of teaching girls a mathematics that may be useful to them.

As well, traditional maths teaching has suited boys more than girls. Maths is taught as an abstract body of truth, unrelated to human endeavour. When examples from the real world are called for, they are drawn from the boys' world of hardware and sport.

Maths is taught in a competitive way, with the spoils going to the swiftest.

What we know of girls' psychology shows they prefer to work co-operatively, to discuss things and to feel the subject is related to the world.

(Adele Horin, *Sydney Morning Herald*, Tuesday, September 11, 1990.)

NEWS ABOUT MEMBERS

The Victorian Branch of the Statistical Society is losing both **Teresa Dickinson** and **Richard Jarrett** to South Australia. Both of them have been working in the Statistical Consulting Centre at the University of Melbourne.

Richard and his wife, Di, are both from South Australia. Richard is President of the SSA and has contributed to the statistical scene in Melbourne for many years. He was Senior Regional Officer with CSIRO Division of Mathematics and Statistics in Melbourne for some of the time that I have been with the Division. I particularly valued the way he supported other people's interests rather than pushing his own barrow. He will be taking up a position as professor at the University of Adelaide from the start of 1991.

Teresa is currently assistant secretary for the Council of the Victorian Branch. She is going to be working with the CSIRO Division of Mathematics and Statistics, particularly with John Field.

Teresa's father taught me quite a lot about practical statistics. He is a bitumen chemist — now formally retired, but still professionally active. I regarded him as a very good scientist when I worked with him at the Australian Road Research Board from 1976 to 1980. He had more idea than I had of what he should be able to expect from me as a statistician. He was always patient when I answered the wrong questions or expressed my answers very badly.

Geoff Robinson

Dr Bob Mellor from the University of Western Sydney, Macarthur spent the first half of 1990 in the United Kingdom at the University of Warwick. Most of his time

was devoted to the studies that he has been carrying out with Dr Larry Dwyer on the New Product Management Process and Product Innovation Strategies of companies. Bob visited a number of Business and Management Schools in the United States and Europe and presented seminars at Warwick Business School and the School of Management Studies, University of Twente in the Netherlands.

The President of the Canberra Branch, **Dr Alan Welsh** of the Department of Statistics, Faculty of Economics and Commerce at ANU has been awarded the inaugural Moran Medal.

The Moran Medal, awarded by the Australian Academy of Science, honours Professor Patrick Moran who held the first chair of statistics at the Australian National University. It is awarded to a young Australian scientist for research in one of the fields of applied probability, biometrics, mathematical genetics, psychometrics and statistics.

Since gaining his PhD, Dr Welsh has made significant research contributions in several areas of statistics, including robust statistics, asymptotic theory and resampling methods. He has broad research interests of both a theoretical and applied nature.

He was awarded the University Medal in mathematical statistics at the University of Sydney in 1982 and completed his PhD at the Australian National University. He held the position of assistant professor in the Department of Statistics at the University of Chicago from 1984-1987 before returning to the Australian National University.

VISITORS

Kung Yee Liang, John Hopkins University; 3 - 10 December 1990; Department of Statistics, La Trobe University; Dr Chris Lloyd, (03) 479 2091

Per Kragh Andersen, University of Copenhagen; 3 - 10 December 1990; Department of Statistics, La Trobe University; Dr Chris Lloyd, (03) 479 2091

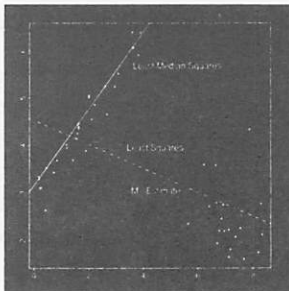
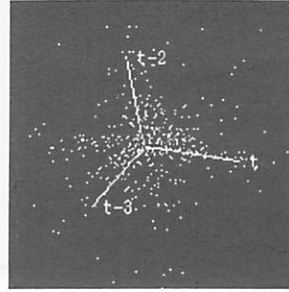
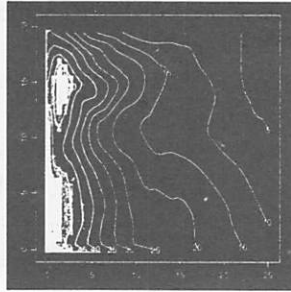
Assistant Professor D.A. Ratkowsky, Washington State University, Pullman, USA; 2 February - 2 March 1991; IAPP Biometrics Unit, CSIRO, Lindfield; Dr J. Best.

Mr J.C.W. Rayner; University of Otago, New Zealand; 9 December 1990 - 31 March 1991; IAPP Biometrics Unit, CSIRO, Lindfield; Dr J. Best.

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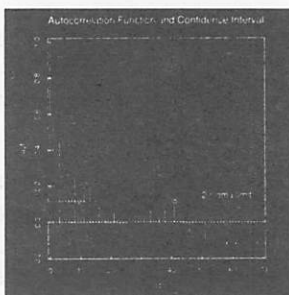
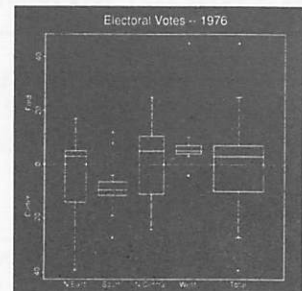
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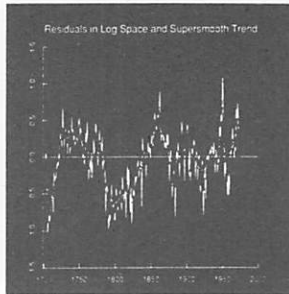
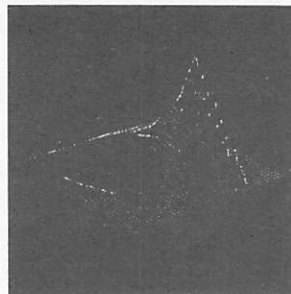
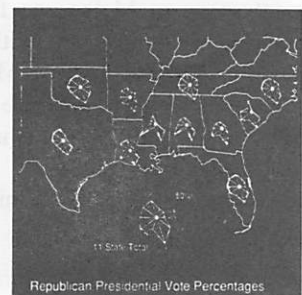
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AUSTRALASIAN CONFERENCES

CONFERENCE SUMMARY

Symposium on Modern Regression Methods, 2-3 April 1991, University of New South Wales, Kensington. (Full details this issue.)

Dr Simon Sheather, AGSM, UNSW, PO 1, KENSINGTON NSW 2033.

Combined Statcomp/Biological Statistics Meeting, 1 - 5 July 1991, Coolangatta, Queensland.

Prof. Tony Pettit, School of Mathematics, QUT, GPO Box 2434, BRISBANE QLD 4001, Telephone (07) 223 2309, Fax (07) 229 1510, email zsmappettit@qut.edu.au. (Full details Newsletter 51 and this issue.)

Data Analysis Workshop on Design of longitudinal studies and analysis of repeated measures data, 10-12 July 1991, ANU, Canberra. (Full details this issue.)

Dr Sue Wilson, Statistics, IAS, ANU, GPO Box 4, CANBERRA ACT 2601.

Australasian Meeting of the Econometric Society, 10-13 July 1991, UNSW, Sydney, NSW. (Full details this issue.)

Programme Co-Chairmen: Ross Milbourne and Ronald Bewley, School of Economics, University of New South Wales, PO Box 1, KENSINGTON NSW 2033.

Workshop on Saddlepoint Methods in Statistics, 17-19 July 1991, ANU, Canberra. ((Full details this issue.)

Dr Jim Booth, Statistics Research Section, ANU, GPO Box 4, CANBERRA ACT 2601, tel. 249 4543, fax 249 0759, email jim@srsi.anu.oz.au

Twelfth International Joint Conference on Artificial Intelligence (IJCAI-91), 24-30 August 1991, Sydney.

Information: Joseph Katz, MITRE Corporation, MS-K318, Burlington Road, Bedford, MA 01730, USA.

SYMPOSIUM ON MODERN REGRESSION METHODS

The NSW branch of the Statistical Society of Australia is organising a symposium on Modern Regression Methods, to be held 2 - 3 April 1991 at the University of New South Wales. Invited speakers for the symposium and their topics are:

Raymond Carroll, Texas A&M University, "Nonlinear measurement error models";

David Ruppert, Cornell University, "Robust regression";

Sandord Weisberg, University of Minnesota, "Regression diagnostics";

Robert Staudte, La Trobe University, "Robust designs or robust variable selection";

Alan Welsh, Australian National University, to be advised.

Following the day-and-a-half symposium there will be a half day "hands on" workshop run by Sandy Weisberg demonstrating the XLISPSTAT software. Registrations for the workshop are limited to the first 50 paid up applicants.

For further information please contact: Dr Simon Sheather, AGSM, University of New South Wales. Phone: (02) 662 0258, email: sish@mummy.agsm.unsw.oz.

STATCOMP/BIOSTATS 91, 1-5 July, 1991

STATCOMP/BIOSTATS 91 is the biennial meeting of the Statistical Computing and Biological Statistics Sections of the S.S.A., being held in conjunction with the Biometric Society (Australasian Region), the International Association for Statistical Computing (ISI) and the CSIRO Biometrics Units. The 1st circular was sent to

the branch secretaries mid-October for distribution to members. Please contact your secretary or the conference secretary if you did not receive one. The notice of intent from the 1st circular should be returned to the conference secretary by 14 December 1990. The 2nd circular will be distributed mid-January 1991.

The Conference will be held in the week 1-5 July, from Monday morning to Friday lunchtime, at the Greenmount Resort Hotel at Coolangatta on the Qld-N.S.W. border. STATCOMP will occupy the first half of the programme and BIOSTATS the second half.

As usual, there will be book displays, demonstrations of computer software and hardware, and opportunities for delegates to exchange and evaluate each others software.

Keynote Speakers: STATCOMP

Julian Basag: Computational aspects of image & spatial analysis;

Peter Hall: Computational techniques for the bootstrap;

Peter Thomson: Smoothing algorithms for time series;

Sanford Weisberg: Dynamic graphical techniques in diagnostics.

Keynote Speakers: BIOSTATS

Kaye Basford: Three-way methods for multi-attribute GxE data;

Chris Glasbey: Image analysis in agricultural research;

Charles McGilchrist: Mixed models for discrete data;

Roger Mead: Measurement scales and self adjustment;

Richard Morton: Over-dispersion in generalised linear models.

Papers are invited in all areas of Statistical Computing and Biological Statistics, especially in line with the invited speakers topics. They will be presented by lecture format, with 25 minutes for the lecture and 5 minutes for questions. (If demand warrants, there may be poster sessions.) Abstracts of all papers are required, should be informative and occupy one A4 page, with a margin of 3cm on both sides. The format is a title, followed by the author(s) name(s) and address(es), followed by the abstract. Abstracts must be received by the Secretary by 31 March 1991.

The STATCOMP-BIOSTATS student prize will be awarded for the best paper presented as a lecture by a postgraduate student. To be eligible, a student should be currently enrolled or have submitted a thesis within the last 6 months before the Conference.

For additional information, Dr. R.J. Wilson, Conference Secretary, STATCOMP/BIOSTATS 91, Department of Mathematics, University of Queensland, QLD 4072, phone (07) 377 2518; fax (07) 870 2272; e-mail rjw@axiom.maths.uq.oz.au

WORKSHOP ON SADDLEPOINT METHODS IN STATISTICS, 17 - 19 July 1991

The Centre for Mathematics and its Applications at ANU will hold a workshop on the theory and use of saddlepoint methods in statistics from Wednesday 17 to Friday 19 July 1991.

Contributions to the workshop will include:

Dr J.G. Booth	Australian National University
Professor R.W. Butler	Colorado State University, USA
Professor J. Robinson	University of Sydney
Dr G.A. Young	University of Cambridge, UK.

The workshop will begin with some introductory lectures and then focus upon recent advances in saddlepoint methodology and the wide variety of applications of saddlepoint methods in statistical problems.

For further information contact: Jim Booth, Statistics Research Section, ANU, GPO Box 4, CANBERRA ACT 2601, tel. 249 4543, fax 249 0759, email jim@srsi.anu.oz.au

DATA ANALYSIS WORKSHOP, 10 - 12 July, 1991**Design of longitudinal studies and analysis of repeated measures data**

The second Workshop in this series which is designed for those who are interested in the analysis of complex data sets of fundamental practical importance is currently being organised. The aim of this Workshop Series is to establish the current "state of the art" in each of the chosen fields. There are several reasons for the present choice of topic. First, it provides continuity with the theme of the first Workshop (on the formulation, fitting and statistical analysis of linear simultaneous equation models). Second, the topic is widely applied in many fields, including medical science, agricultural and biological sciences, education and social research, psychometrics, econometrics, pharmacology, among others. Third, this topic has seen significant developments during the last decade following developments in modern computer technology that have significantly decreased the unit cost of data capture, data storage and data linkage across different measurements on the same individual. Australia is currently at the stage of creating, rather than utilising, longitudinal data bases, and needs to ensure that the full potential of these data bases is realised.

Professor David Hand, co-author of the monograph *Analysis of Repeated Measures* (Chapman and Hall, 1990) will be one of the keynote speakers. Another keynote speaker will be **Dr Chris Glasbey** from the Scottish Agricultural Statistics Service.

This Workshop will confront the methodological and practical problems arising in the design of longitudinal studies and analysis of repeated measures data using the same format as used successfully before; namely, data sets that highlight fundamental methodological problems of concern to both applied and statistical scientists will be made available to participants. Any contributions and/or suggestions would be welcomed by the Workshop co-ordinator, Sue Wilson. Eligibility for Workshop participation will be determined by researchers either providing data, or presenting analyses, or by presenting a theoretical contribution relevant to the Workshop theme.

Further information is available from: Sue Wilson, Statistics, IAS, The Australian National University, GPO Box 4, CANBERRA ACT 2601, Tel: 61+(6) 249 4460; Fax: 61+(6) 249 0759; email: srw308@csc2.anu.oz

**AUSTRALASIAN MEETING OF THE ECONOMETRIC SOCIETY
ANNOUNCEMENT AND CALL FOR PAPERS**

The 1991 Australasian Meetings of the Econometric Society will be held at the University of New South Wales, Sydney, from 10 - 13 July 1991.

The program will consist of invited and contributed papers in areas of economic theory, econometric theory, and applied econometrics. The Program Committee is actively seeking papers from researchers in these areas. Prospective contributors are requested to submit three copies of an abstract of their paper to one of the Program Co-Chairmen as soon as possible. The deadline for the receipt of abstracts is 28 February 1991. Each abstract must contain the name(s) of the author(s), the complete address(es) and a contact telephone number. Since a submission is more likely to be accepted if evidence is presented that the results described in the abstract have been achieved, applicants are encouraged to submit a completed paper. In any event, three copies of the full manuscript must be submitted by 30 April 1991.

The meetings are open to all economists, and econometricians, including those who are not currently members of the Econometric Society. Accommodation has been reserved on the University of New South Wales campus. Motel and hotel accommodation can be arranged close to the campus. Detailed information on registration and accommodation will be available at a later date and will be sent to all who apply to give papers, to Australasian members of the Econometric Society, and to registrants at the 1989 Australasian Meetings in Armidale. Others may receive the same information by writing to one of the Program Co-Chairmen.

Program Co-Chairmen: Ross Milbourne and Ronald Bewley, School of Economics, University of New South Wales, PO Box 1, KENSINGTON NSW 2033, telephone (02) 697 3380; fax (02) 313 6337.

**STATISTICAL
CONSULTING CENTRE**

Research Assistant Gr 2/Research Fellow Gr 1

This position is part of a team of statistical consultants undertaking research and collaborative work both within the University and with clients in a wide range of organisations in industry, commerce, medicine and government. Major areas of activity are biostatistics, epidemiology, industrial statistics (including quality improvement), surveys, time series and stochastic processes.

Initially, you will provide support to the other consultants on a range of consulting and research projects; however, with time, you will undertake consulting projects on your own. You need to have an Honours or Masters degree with major qualifications in statistics. Experience with programming and statistical packages is essential and some experience in consulting would be an advantage.

The appointment is until 31 December 1991 in the first instance with the possibility of an extension. An appointment at the Research Fellow level will be made if the candidate can already work as a consultant with a minimum of supervision.

Further information: Dr R. Jarrett, Director (03) 344 6995. A position description is available on request.

Salary: \$24,197-\$27,996 p.a. (Research Assistant Gr 2) or \$28,792-\$32,762 p.a. (Research Fellow Gr 1).

Applications Close: 30 October, 1990.

Reference No: Y/619/020.

Written applications quoting the reference number, a contact telephone number and the addresses, telephone and fax numbers of 3 referees to The Director, Personnel Services, The University of Melbourne, Parkville, Victoria, 3052.

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**THE UNIVERSITY
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OVERSEAS CONFERENCES

3rd International Workshop on Artificial Intelligence and Statistics, 2-5 January 1991, Fort Lauderdale, FL USA.

Information: William DuMouchel, BBN Software Products Corp., 10 Faucett Street, Cambridge, MA 02238, USA.

ASA Winter Conference - theme 'Statistics and the Environment', 3-5 January 1991, New Orleans, LA, USA.

Information: ASA, 1429 Duke Street, Alexandria, VA 22314-3402, USA.

Census Bureau's 1991 Annual Research Conference (ARC 1991), 17-20 March 1991, Arlington, Virginia, USA

Information: Maxine Anderson-Brown, Conference Coordinator, Bureau of the Census, United States Department of Commerce, Washington, DC 20233, USA.

4th Valencia International Meeting on Bayesian Statistics, 15-20 April 1991, Peniscola, Spain.

Information: Professor J.M. Bernardo, Palacio de la Generalidad, Caballeros 2, E-46001 - Valencia, Spain.

International Symposium on Nonparametric Statistics and Related Topics, 5-9 May 1991, Ottawa, Canada.

Information: A.K. Md.E. Saleh, Dept. of Mathematics, Carleton University, Ottawa, Ontario, Canada K1S 5B6.

International Biostatistics Conference in the Study of Toxicology, 23-25 May 1991, Tokyo, Japan.

Information: Isao Yoshimura, Secretariat, Local Organizing Committee, c/o SAIENTISUTO-SHA, 3-2 Kandasurugadai, Chiyoda-ku, Tokyo 101, Japan.

11th International Symposium on Forecasting (ISF), 9-12 June 1991, New York, USA.

Information: Dr Lilian Shiao-Yen Wu, Mathematical Sciences Dept., IBM-Thomas J. Watson Research Centre, PO Box 218, Yorktown Heights, NY 10598, USA.

Bernoulli Society 20th Conference on Stochastic Processes and their Applications, 10-14 June 1991, Nahariya, Israel.

Information: R. Adler, Industrial Engineering and Management, Technion, Haifa 32000, Israel.

International Research Conference on Reliability, 19-22 June 1991, Columbia, MO, USA.

Information: Asit P. Basu, Conference Coordinator, 328 Mathematical Sciences Building, University of Missouri-Columbia, Columbia, MO 65211, USA.

International Conference on Game Theory, 25-27 June 1991, Fiosole (Florence), Italy.

Information: Piero Tani, Dipartimento di Scienze Economiche, Università di Firenze, via Curtatone 1, 50123 Firenze, Italy.

Joint Meeting of the Society for Clinical Trials and International Society for Clinical Biostatistics, 8-12 July 1991, Brussels, Belgium.

International Conference on Industrial and Applied Mathematics (SIAM), 8-12 July 1991, Washington, DC, USA.

Information: SIAM, 3600 University City Science Center, Philadelphia, PA 19104-2688, USA.

International Workshop on Statistical Modelling and Latent Variables, 15-17 July 1991, Trento, Italy.

Information: K. Haagen, Istituto di Statistica, Università di Trento, Via Verdi 26, 38100 Trento, Italy, Fax (*39)-461-881499 or Hans Schadee, Dipartimento di Politica Sociale, Università di Trento, Via

Verdi 26, 38100 Trento, Italy, email CONF91@ITNCISTI or SCHADEE@ITNCISTI.

1991 Joint Statistical Meetings, 19-22 August 1991, Atlanta, GA, USA.

Information: ASA, 1429 Duke Street, Alexandria, VA 22314-3402, USA.

IMSIBAC-4, 4th International Meeting of Statistics in the Basque Country, 4-7 September 1991, Bilbao, SPAIN.

Information: J.P. Vilaplana, P.O. Box 32, 48940 LEJONA/LEIOA, SPAIN.

International Statistical Institute, 48th Biennial Session; 9-17 September 1991, Cairo, Egypt.

Information: ISI Permanent Office, 428 Prinses Beatrixlaan, PO Box 950, 2270AZ, Voorburg, The Netherlands.

Statistics in Public Resources and Utilities, and in Care of the Environment (SPRUCE), 7-10 April 1992, Lisbon, Portugal.

Information: V. Barnett, Dept. Probability & Statistics, The University, Sheffield, S3 7RH, UK; Phone (44) 742 768555, ext. 4297; Fax(44) 742 739826; e-mail IVB@UK.AC.SHEF.PA

Fifth International Symposium on Statistical Decision Theory and Related Topics, 14-20 June 1992, West Lafayette, USA.

Information: Shanti S. Gupta, Dept. of Statistics, Purdue University, West Lafayette, IN 47907, USA.

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SCHOOL OF MATHEMATICS

PROFESSOR OF STATISTICS

Applications are invited for a Chair of Statistics. Applicants must have a distinguished record of research and scholarship in Statistics, and be committed to providing academic leadership.

The School of Mathematics is one of the largest in Australia and has a record of excellence in research and teaching at all undergraduate and postgraduate levels. Within the School, the Department of Statistics, with an academic staff of around 10, has active research groups in design and analysis of experiments, engineering statistics, stochastic calculus, financial mathematics, clinical trials and statistical computing. The Department encourages interaction with other disciplines, and research activity involving applications. In addition the School of Mathematics is currently building up strength in the area of mathematical and statistical computer science.

The new Professor will be expected to serve as Head of Department or Head of School for a term or terms if so requested.

Salary: \$67,812 per annum.

Further information may be obtained from Professor I. H. Sloan, Head of School (02) 697 2957, or from the Dean of the Faculty of Science, Professor G. Brown (02) 697 2960.

Subject to the consent of the University, professors may undertake a limited amount of consultative work.

The University reserves the right to fill any chair by invitation.

Applications close on Friday, 29 March 1991.

NJA

Details of the position, together with the conditions of appointment, are available from the Head, Senior Appointments Unit, UNSW, PO Box 1, Kensington, NSW 2033.

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Members are requested to notify their local branch secretaries (see this page of the Newsletter) of change of address, in order that Newsletters and Journals can continue to be despatched to them.