THE AUSTRALIAN NATIONAL UNIVERSITY

FACULTY OF ECONOMICS

DEPARTMENT OF STATISTICS

ANNUAL REPORT 1968

Staff:

Professor	-	E.J.Hannan, B.Com.(Melb.), Ph.D.
Readers	-	C.R.Heathcote, B.A.(W.Aust.), M.A.(Melb.), Ph.D.
		C.C.Heyde, M.Sc.(Syd.), Ph.D.
Senior Lecturers	-	S.John, B.Sc.(Trav.), Ph.D.(Indian Stat.Inst.)
		P.Winer, B.Sc.(Rand)
Lecturers	-	J.H.T.Morgan, B.A.(Cantab.), M.Sc.(Case Inst. Tech.)
		N.F.Nettheim, B.Ec.(Syd.), M.Ec., Ph.D.(Stanford)
		E.Seneta, M.Sc.(Adel.), Ph.D.
		R.D.Terrell, B.Ec.(Adel.)
Wool Board Fellow	-	H.I.Toft, B.Com., B.Ec.(Qld.)
Research Assistant	-	N.E.Tuckwell, M.Ec. (to 15.11.68.)
Research Assistant (Wool Board Funds)	-	D.M.Jones, B.A.
Temporary Senior Tutor	-	N.F.MacNally, B.Sc.(Lond.)

Introduction:

The Statistics Department is concerned with teaching and research in probability and statistics, including operational research. Thus it is concerned with the study of systems in whose behaviour chance plays a major part. Somewhat uniquely it is responsible for all teaching in the subject both to economists and to students in Arts and Science, those students coming from the two last named faculties including students whose interests are primarily mathematical. In 1968, for the first time, a unit of operational research was offered.

Research has been substantially concerned with the theory and application of stochastic processes (systems whose behaviour through time is governed by chance laws) including what is usually called time series analysis and some rather applied theories (for example stochastic processes associated with

road traffic problems). The theory of stochastic processes has a wide application in industry (queueing and renewal theory), in natural science (genetics, communication systems, control theory), in social science (analysis of economic time series) and has a profound mathematical content.

Teaching Programme, 1968:

Details of examination results are given in a table on page 5. Failure rates for those students sitting for the final examination are given below.

Failure Rates, %

	Statistics I	Statistics II	Statistics III	Operational Research
1966	34	36	20	-
1967	33	29	0	-
1968	23	26	36	27

The apparent fall in this failure rate for Statistics I in 1968 is probably due to the different examination procedure in 1968, when the first pass paper was examined in the middle of the year. Students who did badly in this withdrew. In other years some of these would have continued to the end of the year and would have increased the end of year failure rate. The other variations are consistent with chance fluctuations from year to year.

Courses:

In 1969 both of the Statistics II and III courses will be subdivided into pass and honours classes during most of the year. In third term options are offered so that, in each of the subjects, 7 hours of lectures are given each week throughout the year.

Research Programme:

Fourier Methods and Stochastic Processes (Hannan, Hume, Nettheim, Terrell).

Limit Laws of Probability and Fluctuation Theory (Heathcote, Heyde, Winer).

Markov Processes, Branching Processes (Seneta).

Operational Research (Morgan).

Multivariate Analysis (John).

Econometrics (Hannan, Terrell).

Ranking Methods (Nettheim).

Publications:

Groves, G.W.[‡] and Hannan, E.J. Time series regression of sea level on
   weather. Reviews of Geophysics, 6, 1968, 129-174.

Hannan, E.J. and Terrell, R.D. Testing for serial correlation after least
   squares regression. Econometrica, 36, 1968, 133-150.

Heyde, C.C.[**] A further generalization of the arc-sine law. Journal of
   the Australian Mathematical Society, 8, 1968, 369-372.

Heyde, C.C.[**] Variations on a renewal theorem of Smith. Annals of
   Mathematical Statistics, 39, 1968, 155-158.

Heyde, C.C.[**] On the converse to the iterated logarithm law. Journal of
   Applied Probability, 5, 1968, 210-215.

Heyde, C.C.[**] On the growth of a random walk. Annals of the Institute
   of Statistical Mathematics, 20, 1968, 315-321.

Seneta, E. Finite approximations to infinite non-negative matrices.
   Proceedings of the Cambridge Philosophical Society, 63, 1967, 983-992.

Seneta, E. The random walk and bacterial growth. Zastosowania Matematyki,
   9, 1967, 135-147.

Seneta, E. The Galton-Watson process with mean one. Journal of Applied
   Probability, 4, 1967, 489-495.

Seneta, E. On the maxima of absorbing Markov chains. Australian Journal
   of Statistics, 9, 1967, 93-102.

Seneta, E. On a certain passage-time property of inhomogeneous random
   walks. Annales de la Société Scientifique de Bruxelles, 82, 1968,
   5-12.

[‡]   Not a member of this University.

[**]   Based on work done prior to joining this University.

Seneta, E. The stationary distribution of a branching process allowing
   immigration: a remark on the critical case. Journal of the Royal
   Statistical Society, Series B, 30, 1968, 176-179.

Seneta, E. Finite approximations to infinite non-negative matrices, II:
   refinements and applications. Proceedings of the Cambridge
   Philosophical Society, 64, 1968, 465-470.

Seneta, E. and Vere-Jones, D.[/] On the asymptotic behaviour of subcritical
   branching processes with continuous state space. Z.Wahrscheinlichkeitstheorie
   verw Geb, 10, 1968, 212-225.

[/]   A member of the Department of Statistics, IAS.

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DEPARTMENT OF STATISTICS - EXAMINATION RESULTS

1. Subject or unit		2. Enrolled	3. Sitting	4. High Distinction	5. Distinction	6. Credit	7. Pass with merit	8. Pass	9. Fail	10. Wastage (i.e. 2 - 3)	11. Failure plus wastage (i.e. 9 + 10)
Statistics I	No.	253	173*	3	1	2	26	101	40	80	120
	%	100	68	1	0	1	10	40	16	32	47
Statistics II	No.	49	39	2	3	-	2	22	10	10	20
	%	100	80	4	6	-	4	45	20	20	41
Statistics III	No.	12	11	-	-	-	1	6	4	1	5
	%	100	92	-	-	-	9	50	33	9	42
Operational Research	No.	22	15	-**	-**	-**	4	7	4	7	11
	%	100	68	-	-	-	18	32	18	32	50

	Enrolled	Sitting	Results	(headings above do not apply)
Final Honours	3	3	3 × H1	
Masters Qualifying	2	2	1 fail, 1 Colombo Plan student to do some further qualifying courses	
Masters Degree	4	1	1 pass	

*   The first examination was held on 6 July.   193 students sat for this examination.

**   There was no distinction course offered in Operational Research in 1968, the first year of the course.
     It will be offered in 1969 and thereafter.