

51/1966

THE AUSTRALIAN NATIONAL UNIVERSITYFACULTY OF ECONOMICSDEPARTMENT OF STATISTICSANNUAL REPORT 1965Staff :

- Professor - E.J. Hannan, B.Com.(Melb.) Ph.D. (on leave to 21/8/65)
- Senior Lecturers - C.R. Heathcote, B.A.(W.Aust), M.A.(Melb.), Ph.D.  
S. John, B.Sc.(Trav.), Ph.D.(Indian Stat. Inst.)  
W.J. Ewens, M.A.(Melb.), Ph.D.
- Lecturers - P. Winer, B.Sc. (Rand)  
J.H.T. Morgan, B.A.(Cantab.), M.Sc.(Case Inst.Tech.)  
R.D. Terrell, B.Ec.(Adel.)
- Temporary Lecturer- Eirika A. Fridriksdottir, M.Sc.(Econ.) (Prague)  
(to 23/8/65)
- Senior Tutor - E. Seneta, M.Sc.(Adel.)
- Temporary Tutor - J. Shadlow, B.Ec.

Teaching Programme, 1965 :

Subject	Initial Enrolment	Number <sup>α</sup> Examined	H.D. <sup>β</sup>	D.	Cr. <sup>γ</sup>	Pass	Fail
Statistics I	161	125	-	4	29	61	30
Statistics II	33	23	3	2	6	11	1
Statistics III	8	7	1	2	1	2	1
Statistics IV	1	1	1				
Master's Prelim.	3	1					1
Master's Thesis	6	2 <sup>δ</sup>				1	
Ph.D.	2	-					
	214	159	5	8	30	75	33

<sup>α</sup> One student is to be examined in February.

<sup>β</sup> Including 1st-class Honours.

<sup>γ</sup> Including Pass with Merit.

<sup>δ</sup> One student to resubmit after minor alterations to thesis.

There are a number of things to be commented on in relation to these statistics.

The first is the failure rate in Statistics I (24%) which is low relative to Economics I (50%) in particular and also a little lower than in recent years (29% in 1964). There were 72 students who enrolled at the commencement of the year for both Statistics I and Economics I. Their results may be displayed as follows :

Passed both subjects .. ..	29
Passed Economics I, Failed Statistics I ..	4
Passed Economics I, Absent, Excluded or Withdrew from Statistics I.. ..	4
Failed Economics I, Passed Statistics I ..	7
Failed both subjects .. .. ..	14
Failed Economics I, Absent, Excluded or Withdrew from Statistics I.. ..	7
Failed Statistics I, Absent, Excluded or Withdrew from Economics I ..	2
Absent, Excluded or Withdrew from both subjects .. .. ..	5
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	72
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There is thus no shred of evidence for any difference in standards between the two subjects. There is a tendency for students to withdraw from Statistics I who sit for Economics I, which may be interpreted as being due to the student's own greater ability to judge how he will perform in a more mathematical type subject. The failure rate, in Statistics I, for those who sat for both subjects ( $20/54 = 37\%$ ) is of course much higher than for Statistics I as a whole. This is apparently due to a tendency for the weaker part-time student to defer Statistics I until the second part-time year, which, if he is really weak, he may never reach. There is also a number of Master's Preliminary students in Demography and Sociology who take Statistics I and these tend to perform reasonably well.

The second matter calling for comment is the absence of high distinctions in Statistics I and the large number of distinctions and high distinctions in Statistics II. The former seems to have been due to a change in part of the distinction course (Demography) which caused some of the best students to sit only at the pass level. The Statistics II class is the best we have had, and the grades given agree very precisely with those given in comparable subjects (particularly Pure Maths II).

## The initial enrolment in Statistics subjects by Faculties

was :

	Arts	Economics	Science	Total
Statistics I	37	124	-	161
Statistics II	20	6	7	33
Statistics III	4	2	2	8
Statistics IV	-	-	1	1
Master's Prelim.	1	1	1	3
Master's Thesis	1	-	5	6
Ph.D.	1	1	-	2
	64	134	16	214

Excluding first year, the faculties of greatest importance were Arts (27), and Science (16) and not Economics (10).

Overseas Visits :

Professor Hannan spent the months from January to May, inclusive, at the Johns Hopkins University. In June he spent a little over a week in Israel at a conference on Geophysical Theory and Computers. About one week in June, July was spent at each of Manchester and Cambridge Universities and about two weeks at London University. He returned on August 21.

Research Programme :

The research work of the members of the academic staff and of research students grouped around a few main topics.

- (1) The statistical analysis of stochastic processes (temporal and spatial). Work here was done by Hannan, Nicholls and Terréll. Particular problems considered related to the general concept of a filter, aliasing and in particular alias free sampling, testing the independence of regression residuals, testing for the presence of periodicities, statistical and probabilistic problems associated with processes in a sphere or in the plane, time series problems associated with the Australian wool market.
- (2) The probability theory of queues and renewal theory (including traffic flow problems) and associated problems of applied probability. Work here was done by Heathcote, Morgan, Cheong, H.A., Cheong, C.K.

- (3) The probability theory of Markovian processes and associated theories. This work was done by Seneta.
- (4) Probabilistic problems in Genetics. This work was done by Ewens and Chia.
- (5) Multivariate Analysis. S. John.
- (6) Statistical problems associated with quantal response. Morgan.
- (7) Asymptotic methods in probability theory. Winer.

Publications :

- Ewens, W.J. "Two diffusion distributions in genetics". Annals Human Genetics, London, Vol. 29, 1-4.
- "A note on Fisher's theory of the evolution of dominance". Annals Human Genetics, Vol. 29, 85-88.
- "The adequacy of the diffusion approximation to certain distributions in genetics". Biometrics, Vol. 21, No. 2, 386-394.
- "Further notes on the evolution of dominance". Heredity, Vol. 20, Part 3, 443-450.
- Hannan, E.J. "The estimation of relations involving distributed lags". Econometrica, Vol. 33, No. 1, 206-224.
- "Group representations and applied probability". Journal of Applied Probability, Vol. 2, No. 1, 1-68.
- Heathcote, C.R. "Random walks and a price support scheme". The Australian Journal of Statistics, Vol. 7, 7-14.
- "A branching process allowing immigration". Journal of the Royal Statistical Society (B), Vol. 27, 138-143.
- "The maximum of the queue G/M/1". Journal of Applied Probability, Vol. 2, No. 1, 206-214.
- "Divergent single server queues". Chapter 5 of Proceedings of the Symposium on Congestion Theory, Univ. of North Carolina Press.

Heathcote, C.R.  
and Cheong, C.K.

"On the rate of convergence of waiting times".  
Journal of the Australian Mathematical Soc., Vol. 5

Seneta, E.<sup>\*\*</sup> and  
Darroch, J.N.<sup>†</sup>

"On quasi-stationary distributions in absorbing  
discrete-time finite Markov chains". Journal of  
Applied Probability, Vol. 2, No. 1, 88-100.

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\*\* Based on work done prior to joining this University.

† Not a member of this University.