

THE AUSTRALIAN NATIONAL UNIVERSITY

School of General Studies

DEPARTMENT OF STATISTICS

ANNUAL REPORT - 1962

Staff

Professor E.J. Hannan, B.Com., Ph.D.

Senior Lecturer C.R. Heathcote, B.A., Ph.D.(from 6th August)

Lecturers P. Winer, B.Sc.
W.J. Ewens, M.A.

Senior Tutors J.H.T. Morgan, B.A., M.Sc.
Barbara A. Prowse, B.Com.

The appointment of Mrs. B.A. Prowse terminated on 15th November, 1962.

Teaching Programme

Statistics relating to courses taught are as follows:

| | Initial Enrolment | Number Examined | HD | D | CR | P | F |
|--------------|-------------------|-----------------|----|---|----|----|----|
| Statistics I | 119 | 81 | - | 2 | 5 | 48 | 26 |
| II | 22 | 18 | 2 | 2 | 3 | 9 | 2 |
| III Option A | 9 | 9 | - | 2 | 2 | 1 | 4 |
| Option B | 7 | 6 | - | 1 | 1 | 2 | 2 |
| Total | 157 | 114 | 2 | 7 | 11 | 60 | 34 |

The Option A course in Statistics III is suitable for social scientists and the Option B course for natural scientists. The two courses overlap to a considerable extent, though this will be less so in future. The failure rates were not significantly different from what could be expected on the basis of past experience except perhaps for the case of Statistics III Option A. The four students who failed here included two who had difficulty with Statistics II and who would have been advised not to attempt Statistics III (on the basis of their weakness in mathematics) were it not for the fact that this subject was necessary so that they could complete a second major. The faculty rules now permit the substitution of another subject.

A short course of statistics was also given for the Botany department.

Two research students proceeding to a Master's degree were supervised during the year, one full-time student, under Professor Hannan, on time series problems and the other, part-time, under Dr. Heathcote on problems in applied probability theory.

Professor Hannan also supervised one Ph.D student from the department of Statistics at the Institute for Advanced Studies.

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Research Programme

Multiple Time Series (Hannan). Work in this field was continued and a paper was presented at a meeting organised by the Office of Naval Research of the U.S.A. and held at Brown University in June 1962. This will be published early in 1963. The work has connections with other problems including that of estimating a regression relation when errors of observation are present and research along this line has been continued. A paper will shortly be submitted for publication.

The Estimation of Seasonal Variation (Hannan). Previous work on this subject was extended and a paper will be published early in 1963.

Renewal Theory (Heathcote). Research carried out in Canberra was a continuation of that commenced at the University of North Carolina. The problem is that of obtaining renewal theorems for sequences of random variables which are not identically distributed but satisfy certain conditions such as convergence in distribution. A related problem, to which the results obtained are applicable, is that of the asymptotic behaviour of the maximum size of a queue. This work has been completed and is being written up for publication.

Genetics (Ewens). Subjects considered were self-sterility populations; populations with selection dependent on gene frequency; mean absorption time in discrete processes; and application of diffusion methods. Some work on the IBM 1620 computer at the Institute of Advanced Studies was also carried out.

Sequential Analysis (Ewens). Asymptotic properties of sequential tests were considered.

Extreme Value Theory (Winer). The application of this theory to physiological problems especially to heat stroke risks has been considered.

Censored Samples (Winer). Singly and doubly censored exponential distributions were investigated.

Publications

Ewens, W.J. and Finch P.D.

"A Generalized single-server queue with Erlang input".
Biometrika 49, 242-245.

Hannan, E.J.

The general theory of canonical correlation and its relation to functional analysis. Jour. Aus. Math. Soc. II, 229-242.

Rainfall Singularities. Jour. Appd. Meteorology, 1, 426-429.

Systematic Sampling. Biometrika 49, 281-3.

Winer, P., *Maritz, J.S. and *Wyndham, C.H.

"Estimation of risks of heat-stroke". Nature 193, 848-849

* Not a member of this University.

E. J. HANNAN

22nd January, 1963.