Edwin James George PITMAN
b. 29 October 1897 - d. 21 July 1993

Summary. The Australian, Edwin Pitman, made rigorous yet applicable contributions to theory in areas as diverse as non-parametric inference and the properties of characteristic functions; concepts such as 'closeness' and 'asymptotic relative efficiency' were developed by him.

Edwin James George Pitman was born in Melbourne, Victoria and died at Kingston near Hobart, Tasmania. In his final year, at school, he gained not only the Wyselaskie and Dixson Scholarships in Mathematics, but also a scholarship to Ormond College at the University of Melbourne.

He graduated B.A. (1921), B.Sc. (1922) and M.A. (1923). In the meantime he was appointed Acting Professor of Mathematics at Canterbury College, University of New Zealand (1922-23). He returned to Australia when appointed Tutor in Mathematics and Physics at Trinity and Ormond Colleges and Part-time Lecturer in Physics at the University of Melbourne (1924-25). In 1926 Pitman was appointed Professor of Mathematics at the University of Tasmania, a position he held until his retirement in 1962.

About two years after his appointment to the Chair, an experimenter at the State Department of Agriculture brought Pitman some data and statistical analyses from field trials on potatoes, together with a copy of R.A. Fisher's (q.v.) *Statistical Methods for Research Workers*. Pitman checked the calculations and studied the Fisher book, which led to continuing collaboration with the Department of Agriculture on its field trials. Pitman later [11] described himself as 'a mathematician who strayed into Statistics'.

Pitman was elected a Fellow of the Australian Academy of Science in 1954, in the first group of elected Fellows. In 1956 he was active in the formation of the Australian Mathematical Society.

He was a renowned member of the Statistical Society of Australia, and elected an Honorary Life Member in 1966. In 1978 the Statistical Society established the Pitman Medal 'for high distinction in Statistics' and awarded Pitman the first of these medals.

Pitman's published work comprises 21 papers and a monograph. Much of his research has been presented in lectures and in other ways. The published work has been very influential, in clarifying the underlying ideas of inference and in defining new and relevant concepts.

Pitman's 1936 paper [3] defines the class of probability distributions that

admits a complete sufficient statistic and also gives a critical account of the related concepts of information and intrinsic accuracy. It yields priority to Darmois (q.v.) (1935), which however is a mere statement of results. In later work [9, 10], Pitman discusses the limits on accuracy of estimation and the inapplicability of the information concept in non-regular cases.

His two papers [7, 8] on inference about location and scale parameters are classics; they define clearly the class of continuous distributions to which the theory may be applied and the limitations to which the inferences drawn from the analysis are subject.

Pitman presented the first systematic account of non-parametric inference [4, 5, 6] and lectured extensively on the subject, both in Australia and in the United States. In [4], he writes, 'The approach to the subject, starting from the sample and working towards the population instead of the reverse, may be a bit of a novelty'; and later, 'the essential point of the method is that we do not have to worry about the populations which we do not know, but only about the sample values which we do know'.

The notes of the 'Lectures on Non-parametric Inference' given in the United States, though never published, have been widely circulated and have had a major impact on the development of the subject.

A major contribution to probability theory is his elegant treatment of the behaviour of the characteristic function in the neighbourhood of the origin. This governs such properties as the existence of moments.

In his research, Pitman was concerned, not only to advance the theory, but also to put the results in a form readily accessible to the user. In his treatment of the Cramér-Rao Inequality [9], for instance, he states, 'we want to apply the Cramér-Rao inequality to statistics that we do not know, and so the regularity conditions should ask as little as possible of the statistic S ... and should be mainly concerned with the family of measures which we know completely'. Elsewhere [11] he remarks 'Regularity conditions for theoretical results are often flung down with scant regard for the possible user. They are often too strong, and they are often difficult to verify in actual cases'.

Pitman was much in demand as a visiting lecturer, especially in the United States. In 1948-49, he was invited to visit Columbia University, the University of North Carolina at Chapel Hill, and Princeton. His next visit to the United States was in 1957, when he was appointed a Visiting Professor at Stanford.

In 1963 he visited Berkeley, and then John Hopkins in Baltimore. He spent 1965 at the University of Adelaide. For 1966 and 1967, the University

of Melbourne appointed him as Visiting Professor, where he did further work on the behaviour of characteristic functions, as well as exploring some novel properties of the Cauchy distribution. In 1969 he visited the University of Chicago. At the University of Dundee in 1973 and at Melbourne in 1974 he put the finishing touches to the monograph [10].

No chronicle of Edwin Pitman's life and achievements would be complete without due recognition of the contribution of his wife Elinor. She and Edwin were married on 7 January 1932. They resided in a large sandstone house, then on the outskirts of Hobart, where Elinor was able to create a tranquil home environment in which Edwin could carry on his work. They had four children: Jane, now Reader in Mathematics at the University of Adelaide; Mary (Mrs John Baldwin), Professor of Environmental Science at Concordia University, Montréal; Edwin Arthur (Ted), a civil engineer with the Tasmanian Department of Main Roads; and James, Professor of Statistics at the University of California, Berkeley.

References

[1] Darmois, G. (1935). Sur les lois de probabilité à estimation exhaustive. *Comptes Rendus de l'Académie des Sciences*, **200**, 1265-1266.

[2] Fisher, R.A. (1925). *Statistical Methods for Research Workers*. Oliver and Boyd, Edinburgh.

[3] Pitman, E.J.G. (1936). Sufficient statistics and intrinsic accuracy. *Proceedings of the Cambridge Philosophical Society*, **32**, 567-579.

[4] Pitman, E.J.G. (1937). Significance tests which may be applied to samples from any populations. *Supplement, Journal of the Royal Statistical Society*, **4**, 119-130.

[5] Pitman, E.J.G. (1937). Significance tests which may be applied to samples from any populations. II. The correlation coefficient test. *Supplement, Journal of the Royal Statistical Society*, **4**, 225-232.

[6] Pitman, E.J.G. (1938). Significance tests which may be applied to samples from any populations. III. The analysis of variance test. *Biometrika*, **29**, 322-335.

[7] Pitman, E.J.G. (1939). The estimation of the location and scale parameters of a continuous population of any given form. *Biometrika*, **30**, 391-421.

[8] Pitman, E.J.G. (1939). Tests of hypotheses concerning location and scale parameters. *Biometrika*, **31**, 200-215.

[9] Pitman, E.J.G. (1978). The Cramér-Rao inequality. *Australian Journal of Statistics*, **20**, 60-74.

[10] Pitman, E.J.G. (1979). *Some Basic Theory for Statistical Inference*. Chapman and Hall, London.

[11] Pitman, E.J.G. (1982). Reminiscences of a mathematician who strayed into statistics. In *The Making of Statisticians*, ed. J. Gani, pp. 112-125. Springer Verlag, New York.

[12] Williams, E.J. (1994). Edwin James George Pitman 1897-1993. *Historical Records of Australian Science*, **10**, 163-171.

Evan J. Williams