

University of Cambridge

Statistics in Cambridge

Notes by A.W.F.Edwards (December 1991)

1. Prehistory

The prehistory of Statistics in Cambridge may be said to start with Augustus De Morgan (matriculated Trinity 1823; Fourth Wrangler 1827) and Robert Leslie Ellis (m. Trinity 1836; Senior Wrangler 1840), both pupils of George Peacock (Trinity), one of the founder-members of the Analytical Society. De Morgan and Ellis both wrote on probability and statistics, and Ellis in particular influenced J.W.L.Glaisher (m. 1867, Second Wrangler 1871) who wrote on the law of error and on least squares and lectured on the combination of observations. Glaisher edited *Messenger of Mathematics* right up to his death in 1928, in which R.A.Fisher's first paper - introducing the method of maximum likelihood - was published.

John Venn (m. Caius 1853, Sixth Wrangler 1857) lectured on Statistics whilst College Lecturer in Moral Science (his lecture notes are in the College Library) and published *The Logic of Chance* in 1866. F.J.M.Stratton (m. Caius 1901, Third Wrangler 1904) lectured on the Combination of Observations whilst College Lecturer in Mathematics. Fisher attended his lectures in about 1911, and so did David Brunt, who based his well-known book *The Combination of Observations* (Cambridge University Press 1917) on them.

2. University Lectureship in Statistics 1912.

In a Report dated 15 May 1912 (Reporter, 1911-12, 1029) the General Board agreed to a proposal by the Boards for Agricultural Studies and for Economics and Politics, supported by the Board for Biology and Geology, to establish a University Lectureship in Statistics 'because circumstances have arisen in which it seems likely that the services of an eminent statistician can be secured for the University if action can be taken immediately'. By Grace 3 of 6 June 1912 the proposal was approved.

Two days later G. Udny Yule was appointed from 1 October 1912. Yule worked in the Faculty of Agriculture, and was already the author of a very influential Statistics text-book *An Introduction to the Theory of Statistics* (London: Griffin, 1911). He retained his Lectureship until the end of 1930, when he was promoted to a new Readership in Statistics from 1 January 1931 (Reporter, 1930-31, 324), just before he retired.

3. Readership in Statistics 1931.

On Yule's retirement John Wishart was appointed to succeed him (1 October 1931). The advertisement had said:

The Reader will be required to give a course of lectures on Advanced Statistical Method mainly designed for mathematicians, and a course of Statistical Method primarily designed for agricultural post-graduate students. He will also act as consultant to the various Agricultural Research Institutes and to the Biological Departments of the University.

Wishart gave his first course, initially entitled 'Mathematical Theory of Statistics', in the Lent Term 1932, and numbered M.S.Bartlett amongst his students; Sir Arthur Eddington lectured on 'Combination of Observations' in the same set of Advanced Lectures promoted by the Faculty of Mathematics (The name 'Part III' of the Mathematics Tripos first appeared in 1935). Indeed, in

1935-36 a student taking 'Part III' could hear Eddington's 'Combination of Observations' in the Michaelmas Term, Wishart's 'Theory of Statistics' in the Lent Term, and H.Jeffreys's 'Probability' in the Easter Term.

Wishart's Readership was primarily assigned to the Faculty of Agriculture. The Faculty of Economics and Politics had by this time established its own University Lectureship in Statistics, and was henceforth to pursue an independent course. He had a strong interest in the teaching of statistics, reading a paper on the subject to the Royal Statistical Society on 20 June 1939 (Some aspects of the teaching of statistics, J.R.S.S., 102, 532-564, 1939) which numbered R.A.Fisher amongst its discussants. He was to return to the topic after the war (see 5). He held his Readership until he lost his life in Mexico in 1956 in a drowning accident. The post lapsed, but not before it had contributed to the foundation of the Statistical Laboratory (see 6 below).

4. University Lectureships in the Faculty of Mathematics 1938-1947.

In June 1938 the Faculty of Mathematics advertised a University Lectureship, special consideration to be given 'to candidates with qualifications in the Theory of Statistics', and in July they appointed M.S.Bartlett to the post from 1 October 1938. He remained until 1947, when he left to become Professor of Mathematical Statistics at Manchester (though his tenure had been interrupted by war work).

By 1946 the Faculty was increasingly concerned to meet the demand for trained statisticians, and H.E.Daniels was appointed to a University Lectureship from 1 October 1946 in addition to Bartlett. Bartlett, however, was soon to leave and in July the Faculty advertised for a replacement Lecturer 'with special qualifications in Statistics'. F.J.Anscombe was appointed from 1 October 1947 and stayed until 1956.

5. The Diploma in Mathematical Statistics 1947.

In a Report dated 14 May 1947 (Reporter, 1946-47, 1058) the General Board considered a report from the Faculty Board of Mathematics proposing the establishment of a Diploma in Statistics and a Statistical Laboratory, the former to be awarded to mathematicians who had attended a course, and been examined, in theoretical and applied Statistics, and the latter 'to provide primarily for the applied work in Statistics for students of this and possibly of other Faculties, including Diploma and research students'.

The Mathematics Faculty proposal had been criticized, said the General Board, by other Faculty Boards because the statement in the Diploma that the candidate had displayed a special knowledge of Statistics and of its application in a certain field might be taken to imply that he was an expert in that field. The solution, to which the Faculty Board of Mathematics had agreed, was to substitute 'Mathematical Statistics' for 'Statistics' in the title of the Diploma, and in this form the Diploma was instituted on 1 October 1947.

In a Royal Statistical Society Discussion Meeting on The Teaching of Statistics on 27 April 1948, opened by John Wishart, he was able to report 'it is now possible for a mathematical graduate at the University of Cambridge to take a one-year Diploma in Statistics, during which time he will be attached to a department where practical statistical work is done, and will be examined finally on his work in the chosen field of application'.

R.A.Fisher had been elected Professor of Genetics in 1943, and watched these developments with interest. Joan Box records in the biography of her father:

'After the diploma in mathematical statistics at Cambridge was offered, to be awarded in recognition of 1 year's work in statistics for graduates in mathematics, Fisher expressed the opinion in 1949 that the regulations would only work well for those students who had already taken mathematical statistics to Part III [of the Mathematical Tripos] and who gave their

year's work principally to understanding an applied field. It seemed to him the attempt by means of a single-year course organized by the faculty of mathematics must necessarily fail to supply the real demand for statistical training:

“There is no wide or urgent demand for people who will define methods of proof in set theory in the name of improving mathematical statistics. There is a widespread and urgent demand for mathematicians who understand that branch of mathematics known as theoretical statistics but who are capable also of recognizing situations in the real world to which such mathematics is applicable” (*R.A.Fisher, The Life of a Scientist*, by J.F.Box, New York: Wiley, 1978).

In 1950 the University did indeed change the regulations for the Diploma so that candidates without adequate mathematical statistics could take two years.

The Statistical Laboratory itself occupied a hut in Corn Exchange Street / St Andrew's Hill (Reporter, 1946-47, 1296) and as yet had no formal existence. Indeed, the 1947 recommendation approved by the University did not mention the establishment of the Laboratory, and the Mathematics Faculty themselves had only formally recommended ‘that rooms be assigned for a statistical laboratory’ (lower-case letters). More than five years were to pass before the Laboratory was officially sanctioned.

6. The Statistical Laboratory 1953.

Regulations for the Statistical Laboratory, which included the post of Director, were proposed by the Faculty Board of Mathematics in October 1952 (Reporter, 1952-53, 810) and approved by the University on 21 March 1953. Oddly, they did not mention what the Statistical Laboratory was for, though the preamble to the Report repeated the requirement for the Laboratory ‘to provide primarily for the applied work in Statistics for students of this and possibly of other Faculties, including Diploma and Research Students’.

In April 1953 J.Wishart, still Reader in Statistics, was appointed Director of the Statistical Laboratory, the Regulation requiring that the Director be a University teaching officer. Thus the first Director actually held his primary post in another Faculty, Agriculture.

Wishart was on leave when he died in 1956, and H.E.Daniels had been appointed his deputy as Director; he continued as Acting Director until he left to become Professor of Mathematical Statistics in the University of Birmingham when, from 1 October 1957, D.V.Lindley, a Demonstrator and then University Lecturer in the Mathematics Faculty since 1948, was appointed Director. Lindley held the Directorship until he resigned at the beginning of 1960 to become Professor of Statistics at the University College of Wales at Aberystwyth, whereupon A.M.Walker (University Lecturer in Mathematics since 1958) was appointed Acting Director, continuing in that capacity until the election of the first Professor of Mathematical Statistics. In addition to those so far mentioned, D.R.Cox was an Assistant Lecturer from 1950 to 1955.

Thus at its inauguration in April 1953 the University Officers attached to the Statistical Laboratory included one Reader, three University Lecturers, and one Assistant Lecturer; namely Wishart, from the Faculty of Agriculture, and Anscombe, Daniels, Lindley and Cox from the Faculty of Mathematics. Within five years only Lindley was left.

7. The Professorship of Mathematical Statistics 1962.

Probably the first public mention of the possibility of a Professorship of Mathematical Statistics is in a 1958 Report of the Faculty Board of Mathematics to the General Board (Reporter, 1958-59, 1375). It proposed the establishment of a Department of Applied Mathematics and Theoretical Physics, and added ‘As regards the Statistical Laboratory, its ultimate status is bound up with the possible establishment of a Chair of Mathematical Statistics. It may well be appropriate to convert

the Statistical Laboratory into a Department once such a Chair exists, but it would be premature to do so now’.

In June 1960 the Council of the Senate reported to the University on a firm proposal to establish a Professorship of Mathematical Statistics (Reporter, 1959-60, 1684) which had emanated from the Faculty Board of Mathematics. The establishment of such a chair was considered desirable ‘both because of the long association of the University with advances in mathematical statistics and the high calibre of Cambridge mathematical students, and because ... a number of other Faculties who call upon the services of the Statistical Laboratory would warmly welcome it’. ‘The [General] Board have said that they now have reason to believe that, by appealing to certain persons and bodies interested in the theory and application of the study of statistics, it may be possible to secure all or a large part of the funds necessary to maintain the Chair’.

The ‘reason’ mentioned by the General Board was the result of an initiative by the Royal Statistical Society, and in particular its President, Dr M.G.Kendall. The Society had been approached by the Faculty of Mathematics with a request that it ‘sponsor an appeal for funds to establish a chair in mathematical statistics’ (Report of the Council of the Royal Statistical Society - Session 1960-61, *J.R.S.S. ‘A’*, **124**, 562, 1961). The Society’s Council at the time had very strong Cambridge connections. In addition to its President, who had graduated from St.John’s in 1929, it contained M.S.Bartlett, H.E.Daniels, and D.V.Lindley, all of whom had recently left the Statistical Laboratory for chairs elsewhere (see 6 above), D.G.Champernowne, Reader in Economics, and G.A.Barnard, D.J.Finney, M.J.R.Healy, and R.L.Plackett, who were all Cambridge graduates.

The University agreed to the Council of the Senate’s proposal, and in October of the following year the Council were able to report (Reporter, 1961-62, 326) that the Royal Statistical Society had organized a successful appeal (the contributing companies and banks are listed in *J.R.S.S. ‘A’*, **125**, 616, 1962). The Council therefore recommended the establishment of the Professorship and that the Professor should be *ex officio* Director of the Statistical Laboratory, whose ‘establishment on a firm basis’ the Faculty Board of Mathematics regarded ‘as a matter of great importance’. The University accepted these recommendations without comment.

The title of the Professorship mirrored the title of the Diploma. No specific University Ordinance was written to describe the Professor's duties, but the origins of the Statistical Laboratory, the involvement of the Royal Statistical Society, and the appeal to ‘persons and bodies interested in the theory and application of the study of statistics’ made clear the intention. Dr M.G.Kendall, as President of the Society, and Professor E.S.Pearson, a Past President, were invited to join the Electors, the complete Board being made up as follows (*Reporter*, 1961-62, 1057):

<i>Council</i>	Sir Joseph Hutchinson	Professor of Agriculture
<i>nominees</i>	E.S.Pearson	Professor of Statistics, University College, London
<i>General</i>	J.M.Thoday	Professor of Genetics
<i>Board</i>	R.B.Braithwaite	Professor of Moral Philosophy
<i>nominees</i>	A.C.Aitken	Professor of Mathematics, University of Edinburgh
<i>Faculty</i>	P.Hall	Professor of Pure Mathematics
<i>Board</i>	M.G.Kendall	London School of Economics
<i>nominees</i>	F.Smithies	University Lecturer in Mathematics

The Electors met on 3 May 1962, and on the following day announced the election of D.G.Kendall, Fellow of Magdalen College, Oxford, who took up the Professorship on 1 October 1962 and held it for twenty-three years.

8. Department of Pure Mathematics and Mathematical Statistics 1964.

The formal establishment of the Statistical Laboratory in 1953 (see 6 above) had not affected any of the posts of the individuals concerned, who (apart from Wishart) remained University Teaching Officers in the Faculty of Mathematics. Within that Faculty, a Mathematical Laboratory (the present-day Computer Laboratory) had been constituted as a Department in 1937 and a Department of Applied Mathematics and Theoretical Physics had been constituted in 1959. The Teaching Officers in the Faculty not attached to these Departments were not affected by these changes.

In 1964 it was decided to organize all these remaining Teaching Officers into a Department of Pure Mathematics and Mathematical Statistics, with the Statistical Laboratory becoming formally a Sub-Department of the whole (*Reporter*, 1963-64, 1181). Thus the prospect of the Statistical Laboratory becoming a separate Department within the Faculty as soon as there was a Professor of Mathematical Statistics, which the Faculty Board had raised in 1958, was not proceeded with, and, unlike the computer scientists who had their own Department - the Mathematical Laboratory - the statisticians were yoked with the pure mathematicians, this being the grouping dictated by the earlier establishment of the Department of Applied Mathematics and Theoretical Physics.

Meanwhile, the University Press had moved to new premises off Brooklands Avenue, and the Council of the Senate was able to allocate the former Printing House to the Mathematics Faculty. The Statistical Laboratory was at the time housed in the basement at the west end of the new Chemistry building in Lensfield Road, but moved with the rest of the newly-created Department of Pure Mathematics and Mathematical Statistics into the warehouse building of the old Printing House.

To this day (1991) no statutory distinction is made between the University Officers in the Statistical Laboratory (other than the Director) and the remainder of the Department. All posts are allocated formally to the Department as a whole. Meanwhile, in 1969, the Mathematical Laboratory ceased to be a Department within the Faculty of Mathematics and became the Computer Laboratory, independent of any Faculty.