Roots of the Iowa State Statistical Center

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(1) Early Developments: Teaching, Consulting and Cooperative Research 1914-1941.

Courses, essentially statistical in nature, were offered by the Department of Mathematics beginning in 1914 and by the Department of Economics beginning in 1915. George W. Snedecor, who had joined the faculty at Iowa State in 1913, undertook the responsibility for the teaching of statistics in Mathematics. However, those interested in taking or auditing these courses were primarily graduate students, teachers, and research workers in substantive fields in Agriculture. In particular, such staff and students in the plant and animal sciences and genetics were discovering the importance of statistical methods in their research investigations. As a consequence of these considerations, and his own interests, Snedecor's courses, starting with his first offered in 1915, were applied and biological in nature. In illustrating each statistical technique or method use was made of real data obtained primarily from agricultural research investigations involving Snedecor as the statistical consultant.

In presenting methods and techniques, in his agriculturally oriented statistical courses, Snedecor made every effort to become acquainted with the early and current developments in biological and agricultural statistics elsewhere. As noted by Lush (1972), "By 1925 Pearl's Biometry for Medical Students and Fisher's Statistical

Methods for Research Workers had appeared, but the former was aimed a little to one side of the interest of most workers in biology and agriculture, while the latter was so condensed - and yet covered so much territory - that only those already experienced in statistical work could begin to appreciate it on first reading." It was Snedecor's outstanding contribution to the improvement of research methods, particularly in the agricultural and biological sciences in the United States, to pioneer in the development and utilization of the new statistical concepts and methodology. Also, in his teaching and consulting and later in his book, Statistical Methods (first edition in 1937 published by the Iowa State University Press), he presented easily followed analyses of real data from experiments and surveys. By 1970 Snedecor's Statistical Methods had gone through six editions with over 100,000 copies sold, not counting translations appearing in many foreign languages including Japanese and Romanian.

In the spring of 1924, Henry A. Wallace, then an editor of Wallaces Farmer in Des Moines, commuted on Saturdays to Iowa State to conduct a seminar course, with the assistance of Professor Snedecor, for about 20 research faculty members on rapid machine calculation of correlation coefficients, partial correlation, and the calculation of regression lines. Wallace with the assistance of Dr. Charles F. Sarle of the U.S.D.A., then stationed in Des Moines, brought IBM punched card machines to Iowa State to provide computing labor saving facilities. As far as can be ascertained this use, and such subsequent use by the early Iowa State statistical center, was the first use by a university statistical center of IBM punched-card business type machines for statistical analyses of research data.

As an outgrowth of the Wallace seminars, Wallace and Snedecor

co-authored in 1925, Correlation and Machine Calculation, an Iowa State bulletin that attained world-wide distribution. Further, in 1927, Snedecor and A. E. Brandt were placed in charge of a newly created Mathematical Statistical Service (a statistical consulting and computing service) at Iowa State. Although the services were available on a campus-wide basis to faculty members and graduate students engaged in research, those from Agriculture were the principal users.

The Statistical Laboratory was established in 1933, as a research and research service institute directly under the Office of the President with Snedecor as its first director. It evolved from the Mathematical Statistical Services unit in recognition of the importance of statistical methodology in obtaining new knowledge in many substantive disciplines of the university. The beginning staff consisted of Snedecor, A. E. Brandt, Mary Clem, and Gertrude Cox.

In 1935 a Statistical Section (later the Statistics Department) of the Agricultural Experiemnt Station was established with Snedecor as Section Head. From 1935 the AES has given additional financial support to the statistical center for special services in consulting and cooperative research in all fields of agriculture. In particular, Dean Buchanan and later Dean Andre encouraged the agricultural research workers to consult with the statisticians as regards the designs as well as the analysis of experiments and surveys.

Under the terms of the Project Agreement of 1938 between Iowa State and the USDA, carried out by the statistical center for the AES, the staff and facilities of the statistical center were greatly increased. Seven resident collaborators in the applications of statistics

were stationed in Ames by the USDA, six new statistical center positions were created, and the computing staff was proportionally increased. Arnold J. King and Raymond J. Jessen were among the U.S. collaborators stationed in Ames. This USDA project extended the on-campus consulting and cooperative research to national off-campus investigations.

Gerhard Tintner joined the faculty of Iowa State in 1937 with at first a joint appointment in Economics and Mathematics and courtesy listing on the faculty of the Statistical Laboratory. His duties involved teaching and research in econometrics and time series. (In September 1953 he accepted an official joint appointment also with the Iowa State statistical center.)

In 1938 Professor William G. Cochran, from Rothamsted Experiment Station, England, joined the faculty in statistics at Iowa State on a visiting professorship, and the next year continued as a regular faculty member. Also in 1938 C. P. Winsor joined the faculty, coming from Harvard. It then became possible for the statistical center to extend its teaching of statistical theory beyond the first year graduate course in general mathematical statistics (taught for some years by Professor Fred Brandner of the Mathematics Department). Also, specialized theory courses in econometric statistics and time series were introduced.

2. Visits of Eminent Statisticians. During the early years several eminent statisticians, who had developed certain important areas of statistics, visited the statistical center at Iowa State as visiting professors and short-term members of the faculty. R. A. Fisher was a visiting professor in 1931 and again in 1936, during respective summer quarters. His lectures attracted many graduate students from different

sections of the United States and a number of foreign countries to Ames,. During the 1936 visit Iowa State awarded Professor Fisher an honorary D.Sc. degree. Quoting Gertrude Cox (1975) " In so doing, Iowa State recognized the importance of his (Fisher's) contributions to modern statistics with books, articles, and lectures." Iowa State was the first American institute of higher education to recognize the importance of Fisher's work by the award of an honorary doctor's degree.

Professor John Wishart came from Cambridge University for the summer of 1934 to lecture and consult on covariance problems. During the 1937-38 academic year Dr. Frank Yates of the Rothamsted Experiment Station, England, served as a visiting professor to lecture and consult on the design and analysis of replicated experiments. In the spring of 1938, Professor Jerzy Neyman, then of the Galton Laboratory, University of London, visited the Iowa State statistical center to counsel on general problems of survey sampling.

3. Early Degree Programs in Statistics at Iowa State: 1931-1946.

As indicated, the early emphasis of the statistical center at Iowa State was on service, primarily in the agricultural sciences, involving consulting on the design and analysis of experiements, and surveys and the teaching of service courses to graduate students. However, even in the early period, attention was given to the education of statisticians in statistics as a separate discipline. Gertrude M. Cox received the first master's degree in statistics in 1931 and Holly C. Fryer the first Ph.D. in statistics in 1940. These degrees, and all subsequent degrees in statistics, were granted through the Mathematics Department until the separate Department of Statistics

was established in 1947.

These early graduate degrees in statistics, granted through the Department of Mathematics, were made possible primarily through the foresight of Dr. E. R. Smith, then Head of Mathematics and the Iowa State administration and, of course, under Snedecor's direct or overall supervision. After Tintner joined the faculties in Economics and Mathematics in 1937 and Cochran joined the staff and faculty in the Statistical Laboratory and Mathematics in 1938, an additional strong impetus was given to the graduate program in statistics, particularly at the Ph.D. level.

The graduate theses problems were either directly of an applied nature or involved in the development of new statistical theory of direct use in establishing new and/or improved methods for statistical applications in research investigations. As an example of the former, Gertrude M. Cox's M.S. thesis was entitled, "A statistical investigation of a teacher's ability as indicated by the success of his students in subsequent courses;" while one of the latter, R. L. Anderson's Ph.D. thesis was entitled "Serial correlation in the analysis of time series".

4. Period of the Second World War, Beginning in 1941. Quoting from Bancroft (1966).

"The activities of the Statistical Laboratory were affected by the war as students and staff became involved in the war effort. However, the increased need for survey data by the government, which was in part due to the war, led to the expansion of the service work of the Laboratory. Research was extended to include problems related to the federal government through the cooperative projects with the Bureau of Agricultural Economics, the Census Bureau, and the Weather

Bureau. The Master Sample Project, begun in 1943 with the Bureau of the Census and the Bureau of Agricultural Economics, became an important part of the work of the Laboratory. Its function was two-fold: (1) to prepare the essential basic data and materials for samplings of the United States, not only of its agriculture but also of its population; and (2) to prepare, using the basic material in (1) specific samples for field use."

Professor William G. Cochran, who continued on the faculty at Iowa State until 1946, was away on leave in 1944 to serve with a group of statisticians at Princeton University working on war related problems under the support of the U. S. Office of Scientific Research and Development. Again in 1945 Cochran served as a bombing research analyst on a project conducted in Europe by the U. S. War Department. Until 1946, however, he continued his research, consulting, and teaching associations with Iowa State; returning as occasions permitted, to give courses on a quarter at a time basis.

In 1948 Ray Jessen served as chief advisor for an economic and social survey of Crete supported by the Rockefeller Foundation. Norman Strand, who had been associated with Iowa State on and off since 1935, also worked on the Crete survey.

5. Establishing of the Separate Department of Statistics, 1947.

On July 1, 1947 the Department of Statistics was organized as not yet an independent department in what was then the Division of Science (now the College of Sciences and Humanities). Authorization was given for the granting of B.S., M.S., and Ph.D. degrees. In addition to a number of new courses designed primarily for students majoring in statistics, the new department introduced a number of service courses, designed primarily for graduate students majoring in substantive disciplines that use statistics as an important part of their research methodology.

Most faculty members of the statistical center at Iowa State now had joint appointments and partial salary arrangements as between two of the following: Statistical Laboratory, Department of Statistics, and the Statistical Section of the Agricultural Experiment Station (now the Statistics Department of the AES). In later years, such joint appointments were established between the Laboratory and/or the Department (College of Sciences and Humanities) and the Engineering Institute and also with certain other CS & H departments (Economics, Psychology, Mathematics, Political Science, Computer Science, Industrial Engineering).

Unfortunately, no new housing was available for classrooms or offices specifically for the new Department of Statistics. Use was made of the small amount of space in the then Service Building (now part of Snedecor Hall) assigned to Statistical Laboratory staff in 1939. Incidentally, at that time this small building, built by W.P.A. funds, also housed: WOI Radio and T.V., the University Visual Aid Services, the University Photographic Service, and office space for several other miscellaneous groups.

Professor Snedecor retired as Director of the Statistical Laboratory in 1947, although he remained active in statistics on a part-time basis, both at Iowa State and on leave to other American universities and in Brazil, until his final retirement from Iowa State in 1958. Tell about his book

From 1947 through 1949 a committee administered the activities of the Iowa State statistical center. Jessen was Acting Director of the Laboratory and Acting Head of the Department. He was also in charge of the survey sampling sub-group. Arnold King administered the off-campus work with the USDA and other agencies. Alexander Mood, who joined the faculty at Iowa State following World War II, was in charge of the supervision of the graduate programs for the training of statisticians, and took an active part personally in research and teaching

in theory. The first edition of Mood's Introduction to the Theory of Statistics, 1950, was written while he was a professor of statistics at Iowa State.

Professors A. M. Mood and G. W. Brown, who had both joined the Iowa State faculty in statistics after World War II, with Ph.D.'s from Princeton, were on leave during 1948-49 with Rand Corporation. Both resigned in 1949 to remain at Rand.

Professor Oscar Kempthorne, who was to publish his important book, The Design and Analysis of Experiments, in 1952, joined the faculty in statistics at Iowa State in 1947, coming from England with background at Cambridge University and association with Rothamsted Experiment Station.

6. Post World War II Period Beginning in 1950. Since it so happened that I became Director of the Statistical Laboratory and Head of the Department of Statistics (CS&H) and Statistics Department (AES) in 1950, it seems appropriate to me to consider the root years of the Iowa State statistical center as extending from 1914 to 1950.

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