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(*b*. Ruthglen, Scotland, 15 July 1909; *d*. Orleans, Massachusetts. 29 March 1980)

Statistics

Cochran was the son of Thomas and Jeannie Cochran. Thomas Cochran, the eldest of seven children, at age thirteen had to take a job with a railroad company. The Cochrans moved several times, finally settling in Glasgow, where in 1927 William was first in the Glasgow University Bursary Competition; this award enabled him to finance his studies at the university, from which he received an M. A. with first-class honors in mathematics and physics in 1931. He shared the Logan Medal for being the most distinguished graduate of the Arts Faculty. As a result he secured a scholarship for graduate work in mathematics at Cambridge.

John Wishart had transferred from the Rothamsted Experimental Station to Cambridge in 1931; fortunately for statistics, Cochran elected to take Wishart's course in mathematical statistics, followed by his practical statistics course in the School of Agriculture. Cochran wrote his important paper presenting "Cochran's theorem" (1934) under Wishart. In the same year he was offered a position at Rothamsted that had become available when R. A. Fisher left to accept the Galton chair in eugenics at University College, London, and Frank Yates had moved up to become head of the statistics department. Cochran had to decide whether he would complete his doctorate at Cambridge or accept the Rothamsted position. He later confided that it was not a difficult decision, because Great Britain (like the rest of the world) was in the throes of the Great Depression and few positions of this caliber were open. He did receive an M.A. from Cambridge in 1938. In his biographical sketch on Cochran. G. S. Watson states that Yates remarked, "… it was a measure of his good sense that he [Cochran] accepted my argument that a Ph.D., even from Cambridge, was little evidence of research ability, and that Cambridge had at that time little to teach him in statistics that could not be much better learnt from practical work in a research institute,"

Cochran stayed at Rothamsted for five years. During that time he worked closely with Yates on experimental designs and sample survey techniques and had many opportunities to discuss problems with Fisher, who continued to spend much time at Rothamsted. By the time he left, Cochran had published twenty-three papers and had become a wellknown statistician. One of his most exhaustive projects was a review of the long-term series of field experiments at the Woburn Experimental Station. Cochran and Yates collaborated on research on the analysis of long-term experiments and groups of experiments: here Cochran initiated his illustrious research on the chi-squared distribution and the analysis of count data. On 17 July 1937 Cochran married Betty I. M. Mitchell, who had a Ph.D. in entomology, The Cochrans were a popular couple, participating in many social activities. They had two daughters and a son. Cochran visited the Iowa State Statistical Laboratory in 1938 and accepted a position there in 1939 to develop a graduate program in statistics (it was part of the mathematics department until 1947). There he and Gertrude Coxinitiated their collaboration that culminated in their famous book *Experimental Designs* (1950).

Late in 1943 Cochran took leave from Iowa State to join S. S. Wilks's Statistical Research Group at Princeton University as a research mathematician working on army-navy research problems for the Office of Scientific Research and Development, Much of his work there was devoted to an analysis of hit probabilities in naval combat that utilized little of his statistical background. In 1945 he was asked to serve on a select team of statisticians to evaluate the efficacy of the World War II bombing raids.

In 1946 Cochran joined the newly created North Carolina Institute of Statistics (directed by Gertrude Cox) to develop a graduate program in experimental statistics at North Carolina State College (now University); Harold Hotelling was to develop a graduate program in mathematical statistics at the University of North Carolina at Chapel Hill. Cochran was a member of the organizing committee for the International Biometric Society, which was founded in 1947 at Woods Hole, Massachusetts. His major contribution at North Carolina State was setting a firm foundation for a graduate program balanced in theory and practice and well coordinated with the more theoretical program at Chapel Hill.

In January 1949 the Cochrans moved to Baltimore, where he chaired the biostatistics department in the School of Hygiene and Public Health at the Johns Hopkins University, Since he was faced with medical rather than agricultural problems there, he had to develop procedures to obtain reicitable information from observations rather than from expermental data, an area that became his dominant interest for the rest of his life. In 1963 he published *Sampling Techniques*.

Cochran remained at Johns Hopkins until 1957. when he joined the faculty at Harvard University to help Fred Mosteller and others develop the department of statistics. He continued to work closely with research workers at the Medical School and School of Public Health but also did his own research on a variety of topics. In 1967 Cochran was coauthor with G. W.

Snedecor of the sixth edition of the latter's *Statistical Methods*. He retired from Harvard in 1976. Despite a dozen years of serious health problems. Cochran continued a wide range of professional activities and was working on the seventh edition of *Statistical Methods* and a book on observational studies until shortly before his death.

Cochran was president of the Institute of Mathematical Statistics (IMS) in 1946 and the American Statistical Association (ASA) in 1953: he served as editor of the Journal of the ASA (1945–1950). He was president of the Biometric Society (1954–1955) and of the International Statistical Institute (1967–1971); he was vice president of the American Association for the Advancement of Science (AAAS) in 1966. Cochran was elected to the National Academy of Sciences in 1974, He was a fellow of the ASA, the IMS, the AAAS, and the Royal Statistical Society, and was a Guggenheim fellow (1964–1965), He served on a number of scientific investigatory panels, including those concerned with the Kinsey Report, the efficacy of the Salk poliovaccine, the effects of radiation at Hiroshima, and the surgeon general's report on smoking. He wrote more than one hundred scientific articles (which are classified in Anderson).

Probably Cochran's greatest contributions to the scientific community were his guidance of students (he directed more than forty Ph.D. dissertations) and his textbooks. He had the ability to present complicated material in a format that could be understood by anyone who had an interest in collecting and analyzing data. He could explain where the usual assumptions might fail and take steps to ameliorate the effects of these failures. Cochran was quite willing to modify his statistical techniques when faced with such contingencies and often advocated approximate procedures, even though they might violate some of the accepted norms. Although he realized that there are many imperfections in the collection of data, the fact that an ad hoc statistical technique might modify (in an unknown way) the accepted probability levels did not deter him from using it. This pragmatic approach to the collection and analysis of data is held by many to be his most important contribution.

Cochran was that rarity, a man with both a keen mind and the desire to use it for the benefit of mankind. His office was always open to the struggling student, nonplussed scientist, or inquiring citizen.

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