Editors' Preface

In the Winter Quarter of the academic year 1984-1985, Raj Bahadur gave a series of lectures on estimation theory at the University of Chicago. The role of statistical theory in Chicago's graduate curriculum has always varied according to faculty interests, but the hard and detailed examination of the classical theory of estimation was in those years Raj's province, to be treated in a special topics course when his time and the students' interests so dictated. Winter 1985 was one of those times. In ten weeks, Raj covered what most mathematical statisticians would agree should be standard topics in a course on parametric estimation: Bayes estimates, unbiased estimation, Fisher information, Cramér-Rao bounds, and the theory of maximum likelihood estimation. As a seasoned teacher, Raj knew that mathematical prerequisites could not be taken entirely for granted, that even students who had fulfilled them would benefit from a refresher, and accordingly he began with a review of the geometry of L^2 function spaces.

Two of us were in that classroom, WHW who was then a junior member of the statistics faculty and DX who was then an advanced graduate student. We both had previously studied parametric estimation, but never from Raj's distinctive perspective. What started as a visit motivated by curiosity (just how would one of the architects of the modern theory explain what were by then its standard elements?) soon became a compelling, not-to-be-missed pilgrimage, three times a week. Raj's approach was elegant and turned what we thought were shop-worn topics into polished gems; these gems were not only attractive on the surface but translucent, and with his guidance and insight we could look deeply within them as well, gaining new understanding with every lecture. Topics we thought we understood well, such as locally unbiased estimates and likelihood ratios in Lecture 11, and the asymptotic optimality of maximum likelihood estimators in Lectures 28-30, were given new life and much more general understanding as we came to better understand the principles and geometry that underlay them. The two of us (WHW and DX) took detailed notes, reviewing them after the lectures to recover any gaps and smooth the presentation to a better approximation of what we had heard. Some time after the course, Raj was pleased to receive from us an edited, hand-copied version of his lectures.

In these lectures, Raj Bahadur strived towards, and in most cases succeeded in deriving the most general results using the simplest arguments. After stating a result in class, he would usually begin its derivation by saying "it is really very simple...", and indeed his argument would often appear to be quite elementary and simple. However, upon further study, we would find that his arguments were far from elementary — they